

# SCHOOL SCIENCE AND MATHEMATICS

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## OUR FORESTS.\*

BY THEODORE ROOSEVELT.

If there is any one duty which more than another we owe it to our children and our children's children to perform at once, it is to save the forests of this country, for they constitute the first and most important element in the conservation of the natural resources of the country. There are of course two kinds of natural resources. One is the kind which can only be used as part of a process of exhaustion; this is true of mines, natural oil and gas wells, and the like. The other, and of course ultimately by far the most important, includes the resources which can be improved in the process of wise use; the soil, the rivers, and the forests come under this head. Any really civilized nation will so use all of these three great national assets that the nation will have their benefit in the future. Just as a farmer, after all his life making his living from his farm, will, if he is an expert farmer, leave it as an asset of increased value to his son, so we should leave our national domain to our children, increased in value and not worn out. There are small sections of our own country, in the East and in the West, in the Adirondacks, the White Mountains, and the Appalachians, and in the Rocky Mountains, where we can already see for ourselves the damage in the shape of permanent injury to the soil and the river systems which comes from reckless deforestation. It matters not whether this deforestation is due to the actual reckless cutting of timber, to the fires that inevitably follow such reckless cutting of timber, or to reckless and uncontrolled grazing, especially by the great migratory bands of sheep, the unchecked wandering of which over the country means destruction to forests and disaster to the small home makers, the settlers of limited means.

Shortsighted persons, or persons blinded to the future by desire to make money in every way out of the present, some-

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\*Extract from the President's Message, second session of the 60th Congress, December 8, 1908.

times speak as if no great damage would be done by the reckless destruction of our forests. It is difficult to have patience with the arguments of these persons. Thanks to our own recklessness in the use of our splendid forest, we have already crossed the verge of a timber famine in this country, and no measures that we now take can, at least for many years, undo the mischief that has already been done. But we can prevent further mischief being done; and it would be in the highest degree reprehensible to let any consideration of temporary convenience or temporary cost interfere with such action, especially as regards the National Forests which the nation can *now*, at this very moment, control.

All serious students of the question are aware of the great damage that has been done in the Mediterranean countries of Europe, Asia, and Africa by deforestation. The similar damage that has been done in Eastern Asia is less well known. A recent investigation into conditions in North China by Mr. Frank N. Meyer, of the Bureau of Plant Industry of the United States Department of Agriculture, has incidentally furnished in very striking fashion proof of the ruin that comes from reckless deforestation of mountains, and of the further fact that the damage once done may prove practically irreparable. So important are these investigations that I herewith attach as an appendix to my message certain photographs showing present conditions in China. They show in vivid fashion the appalling desolation, taking the shape of barren mountains and gravel and sand-covered plains, which immediately follows and depends upon the deforestation of the mountains. Not many centuries ago the country of northern China was one of the most fertile and beautiful spots in the entire world, and was heavily forested. We know this not only from the old Chinese records, but from the accounts given by the traveler, Marco Polo. He, for instance, mentions that in visiting the provinces of Shansi and Shensi he observed many plantations of mulberry trees. Now there is hardly a single mulberry tree in either of these provinces, and the culture of the silkworm has moved farther south, to regions of atmospheric moisture. As an illustration of the complete change in the rivers, we may take Polo's statement that a certain river, the Hun Ho, was so large and deep that merchants ascended it from the sea with heavily laden boats; to-day this river is simply a broad sandy bed, with shallow, rapid currents.

wandering hither and thither across it, absolutely unnavigable. But we do not have to depend upon written records. The dry wells, and the wells with water far below the former watermark, bear testimony to the good days of the past and the evil days of the present. Wherever the native vegetation has been allowed to remain, as, for instance, here and there around a sacred temple or imperial burying ground, there are still huge trees and tangled jungle, fragments of the glorious ancient forests. The thick matted forest growth formerly covered the mountains to their summits. All natural factors favored this dense forest growth, and as long as it was permitted to exist, the plains at the foot of the mountains were among the most fertile on the globe, and the whole country was a garden. Not the slightest effort was made, however, to prevent the unchecked cutting of the trees, or to secure reforestation. Doubtless for many centuries the tree cutting by the inhabitants of the mountains worked but slowly in bringing about the changes that have now come to pass; doubtless for generations the inroads were scarcely noticeable. But there came a time when the forest had shrunk sufficiently to make each year's cutting a serious matter, and from that time on the destruction proceeded with appalling rapidity; for of course each year of destruction rendered the forest less able to recuperate, less able to resist next year's inroad. Mr. Meyer describes the ceaseless progress of the destruction even now, when there is so little left to destroy. Every morning men and boys go out armed with mattock or axe, scale the steepest mountain sides, and cut down and grub out, root and branch, the small trees and shrubs still to be found. The big trees disappeared centuries ago, so that now one of these is never seen save in the neighborhood of temples, where they are artificially protected; and even here it takes all the watch and care of the tree-loving priests to prevent their destruction. Each family, each community, where there is no common care exercised in the interest of all of them to prevent deforestation, finds its profit in the immediate use of the fuel which would otherwise be used by some other family or some other community. In the total absence of regulation of the matter in the interest of the whole people, each small group is inevitably pushed into a policy of destruction which cannot afford to take thought for the morrow. This is just one of those matters which it is fatal to leave to unsupervised individual control. The forests

can only be protected by the State, by the Nation; and the liberty of action of individuals must be conditioned upon what the State or Nation determines to be necessary for the common safety.

The lesson of deforestation in China is a lesson which mankind should have learned many times already from what has occurred in other places. Denudation leaves naked soil; then gullying cuts down to the bare rock; and meanwhile the rock-waste buries the bottomlands. When the soil is gone, men must go; and the process does not take long.

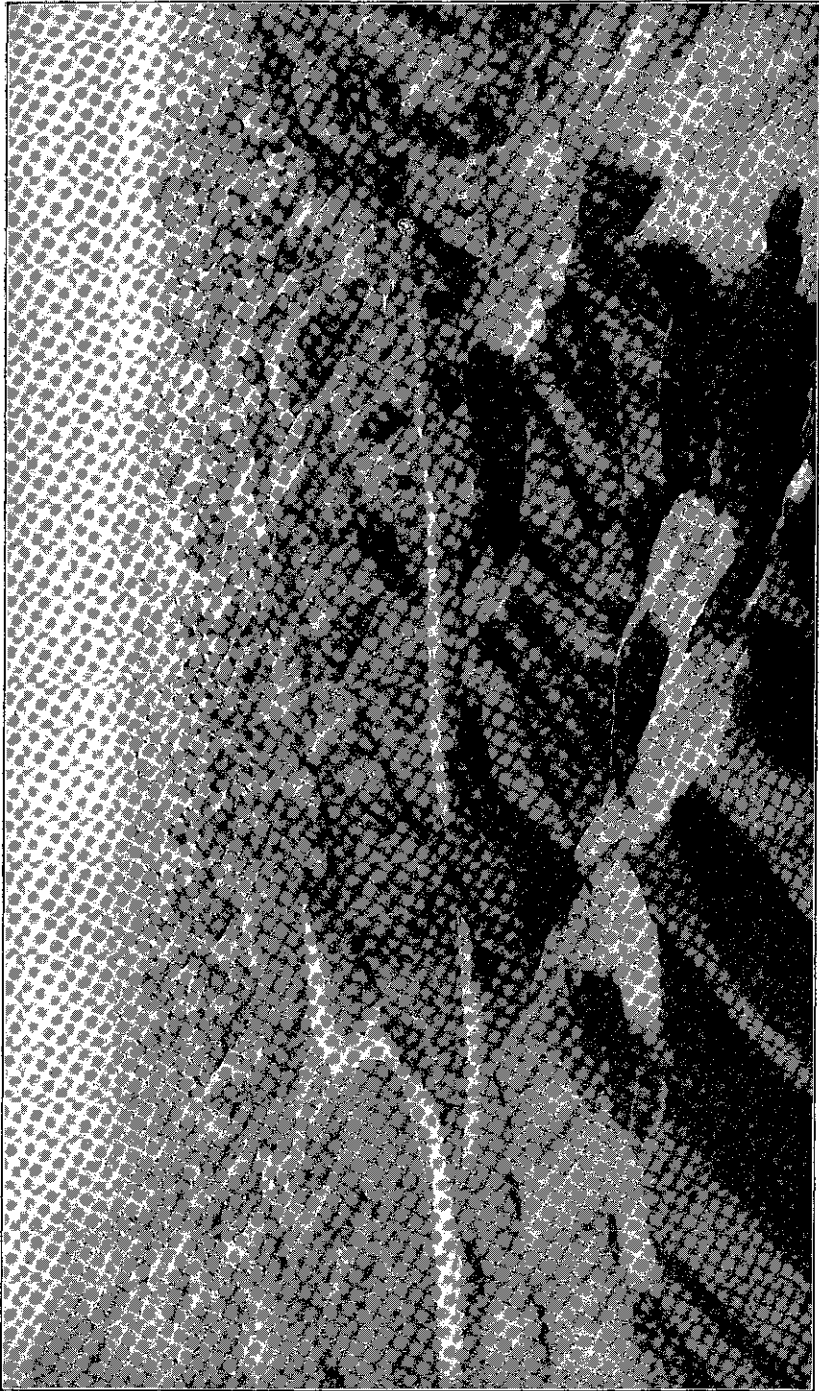
This ruthless destruction of the forests in northern China has brought about, or has aided in bringing about, desolation, just as the destruction of the forests in central Asia aids in bringing ruin to the once rich central Asian cities; just as the destruction of the forests in northern Africa helped towards the ruin of a region that was a fertile granary in Roman days. Shortsighted man, whether barbaric, semicivilized, or what he mistakenly regards as fully civilized, when he has destroyed the forests has rendered certain the ultimate destruction of the land itself. In northern China the mountains are now such as are shown by the accompanying photographs, absolutely barren peaks. Not only have the forests been destroyed, but because of their destruction the soil has been washed off the naked rock. The terrible consequence is that it is impossible now to undo the damage that has been done. Many centuries would have to pass before soil would again collect, or could be made to collect, in sufficient quantity once more to support the old-time forest growth. In consequence the Mongol Desert is practically extending eastward over northern China. The climate has changed and is still changing. It has changed even within the last half century, as the work of tree destruction has been consummated. The great masses of arboreal vegetation on the mountains formerly absorbed the heat of the sun and sent up currents of cool air which brought the moisture-laden clouds lower and forced them to precipitate in rain a part of their burden of water. Now that there is no vegetation, the barren mountains, scorched by the sun, send up currents of heated air which drive away instead of attracting the rain clouds, and cause their moisture to be disseminated. In consequence, instead of the regular and plentiful rains which existed in these regions of China when the forests were still in evidence, the unfortunate inhabitants of the de-

forested lands now see their crops wither for lack of rainfall, while the seasons grow more and more irregular; and as the air becomes dryer certain crops refuse longer to grow at all. That everything dries out faster than formerly is shown by the fact that the level of the wells all over the land has sunk perceptibly, many of them having become totally dry. In addition to the resulting agricultural distress, the watercourses have changed. Formerly they were narrow and deep, with an abundance of clear water the year around; for the roots and humus of the forests caught the rainwater and let it escape by slow, regular seepage. They have now become broad, shallow stream beds, in which muddy water trickles in slender currents during the dry seasons, while when it rains there are freshets, and roaring muddy torrents come tearing down, bringing disaster and destruction everywhere. Moreover, these floods and freshets, which diversify the general dryness, wash away from the mountain sides, and either wash away or cover in the valleys, the rich fertile soil which it took tens of thousand of years for Nature to form; and it is lost forever, and until the forests grow again it cannot be replaced. The sand and stones from the mountain sides are washed loose and come rolling down to cover the arable lands, and in consequence, throughout this part of China, many formerly rich districts are now sandy wastes, useless for human cultivation and even for pasture. The cities have been of course seriously affected, for the streams have gradually ceased to be navigable. There is testimony that even within the memory of men now living there has been a serious diminution of the rainfall of northeastern China. The level of the Sungari River in northern Manchuria has been sensibly lowered during the last fifty years, at least partly as the result of the indiscriminate cutting of the forests forming its watershed. Almost all the rivers of northern China have become uncontrollable, and very dangerous to the dwellers along their banks, as a direct result of the destruction of the forests. The journey from Peking to Jehol shows in melancholy fashion how the soil has been washed away from whole valleys, so that they have been converted into deserts.

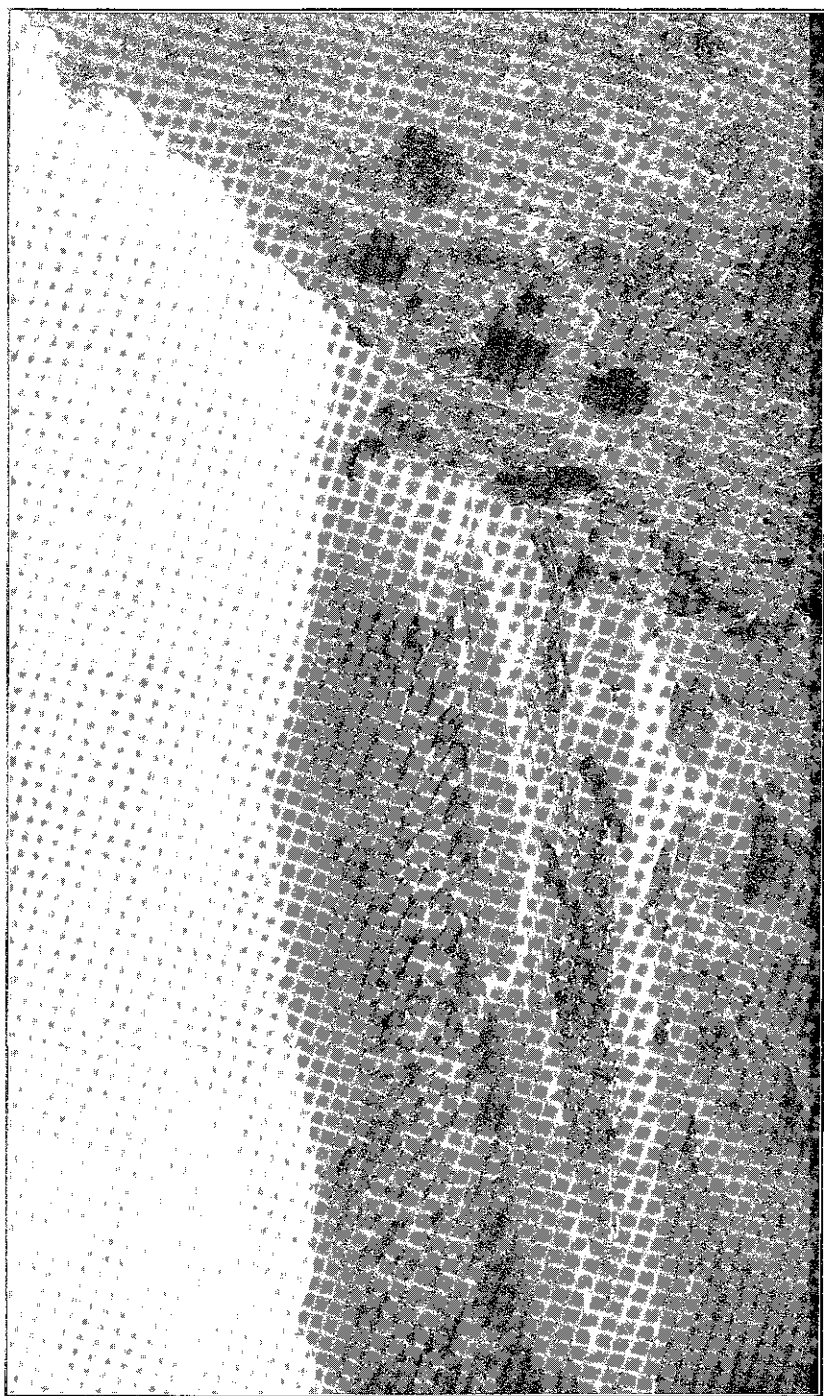
In northern China this disastrous process has gone on so long and has proceeded so far that no complete remedy could be applied. There are certain mountains in China from which the soil is gone so utterly that only the slow action of the ages could

again restore it; although of course much could be done to prevent the still further eastward extension of the Mongolian Desert if the Chinese government would act at once. The accompanying cuts from photographs show the inconceivable desolation of the barren mountains in which certain of these rivers rise—mountains, be it remembered, which formerly supported dense forests of larches and firs, now unable to produce any wood, and because of their condition a source of danger to the whole country. The photographs also show the same rivers after they have passed through the mountains, the beds having become broad and sandy because of the deforestation of the mountains. One of the photographs shows a caravan passing through a valley. Formerly, when the mountains were forested, it was thickly peopled by prosperous peasants. Now the floods have carried destruction all over the land and the valley is a stony desert. Another photograph shows a mountain road covered with the stones and rocks that are brought down in the rainy season from the mountains which have already been deforested by human hands. Another shows a pebbly river-bed in southern Manchuria where what was once a great stream has dried up owing to the deforestation in the mountains. Only some scrub wood is left, which will disappear within a half century. Yet another shows the effect of one of the washouts, destroying an arable mountain side, these washouts being due to the removal of all vegetation; yet in this photograph the foreground shows that reforestation is still a possibility in places.

What has thus happened in northern China, what has happened in Central Asia, in Palestine, in North Africa, in parts of the Mediterranean countries of Europe, will surely happen in our country if we do not exercise that wise forethought which should be one of the chief marks of any people calling itself civilized. Nothing should be permitted to stand in the way of the preservation of the forests, and it is criminal to permit individuals to purchase a little gain for themselves through the destruction of forests when this destruction is fatal to the well-being of the whole country in the future.



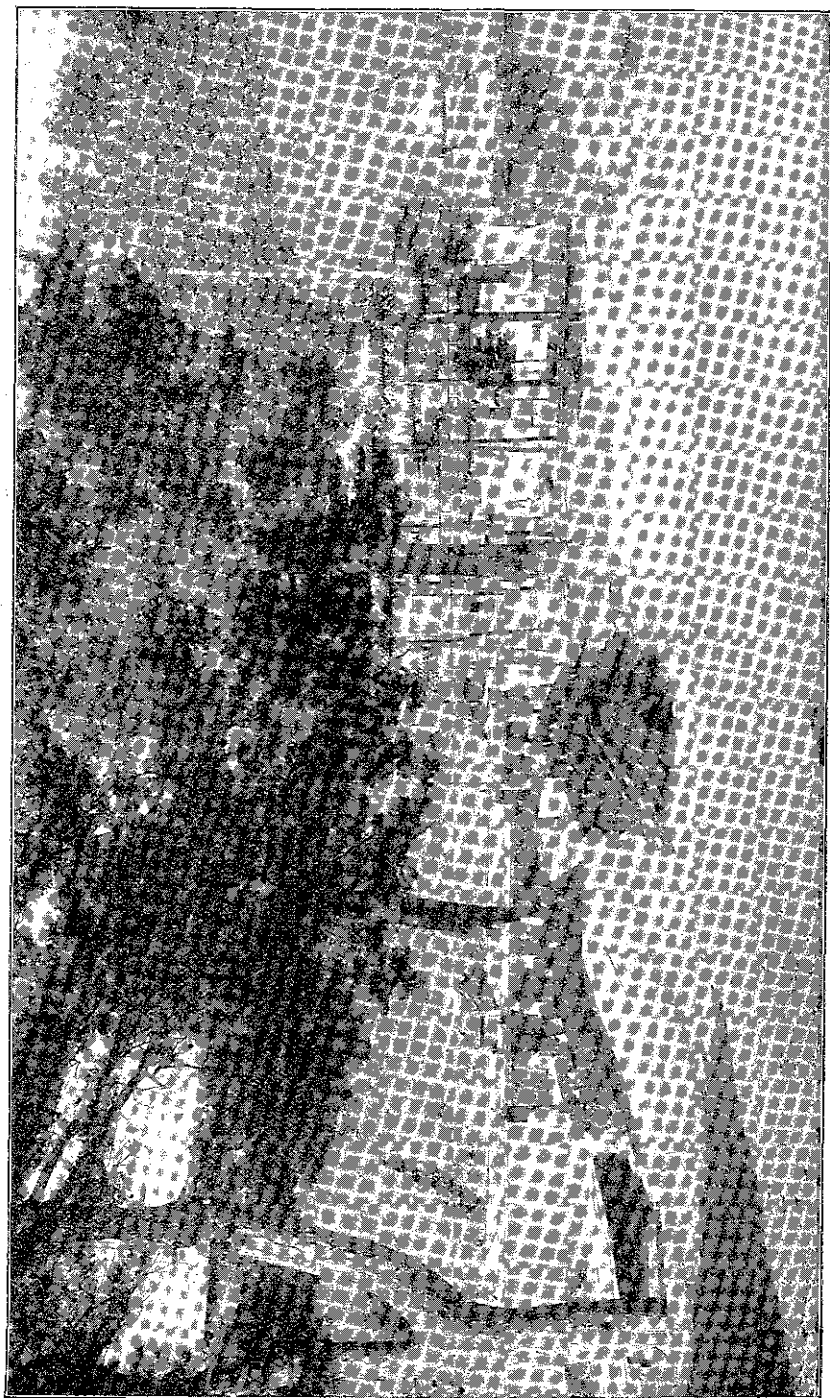
No. 1.—Two Hundred Square Miles of Once Wooded Mountains Which a Century Ago Paid Rich Revenue on Their Lumber Product  
Locality: District of Fou-ping, Chili Province, China. View from the top of a mountain 2,000 feet high, looking down on adjacent hills and valleys.  
Bailey Willis, January, 1904.



No. 2.—Chief City in a District Formerly Rich in Timber

Locality: Fou-ping district, Chili Province, China. View across the valley of the Ta-Sha-ho (Big Sandy River), including the city of Fou-ping and the neighboring mountains of gneiss, a region closely resembling in situation and physical conditions the Piedmont district of the Appalachians from Virginia to Georgia.  
Bailey Willis, January, 1904.



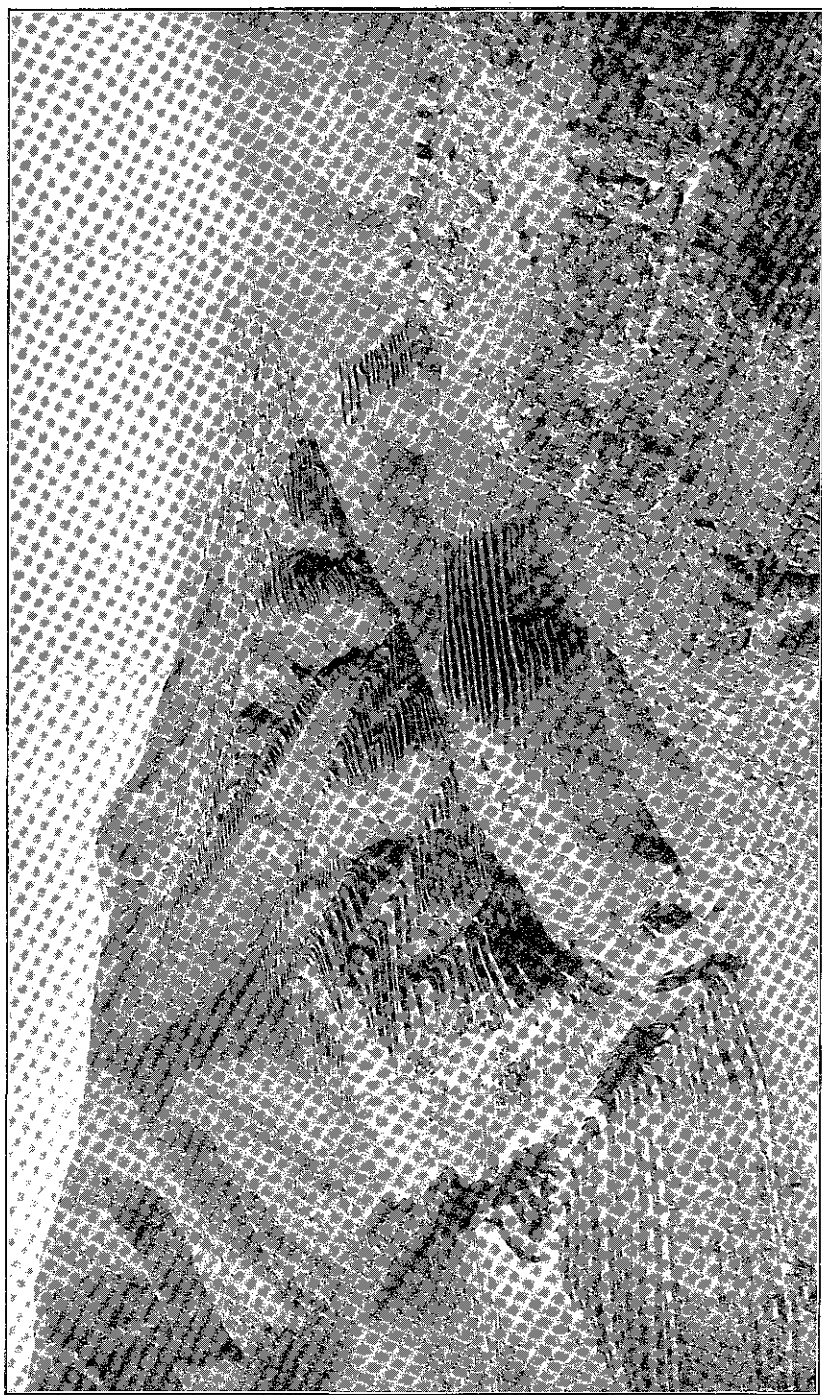


No. 5.—Trees Remain Only Where Protected in Temple Grounds

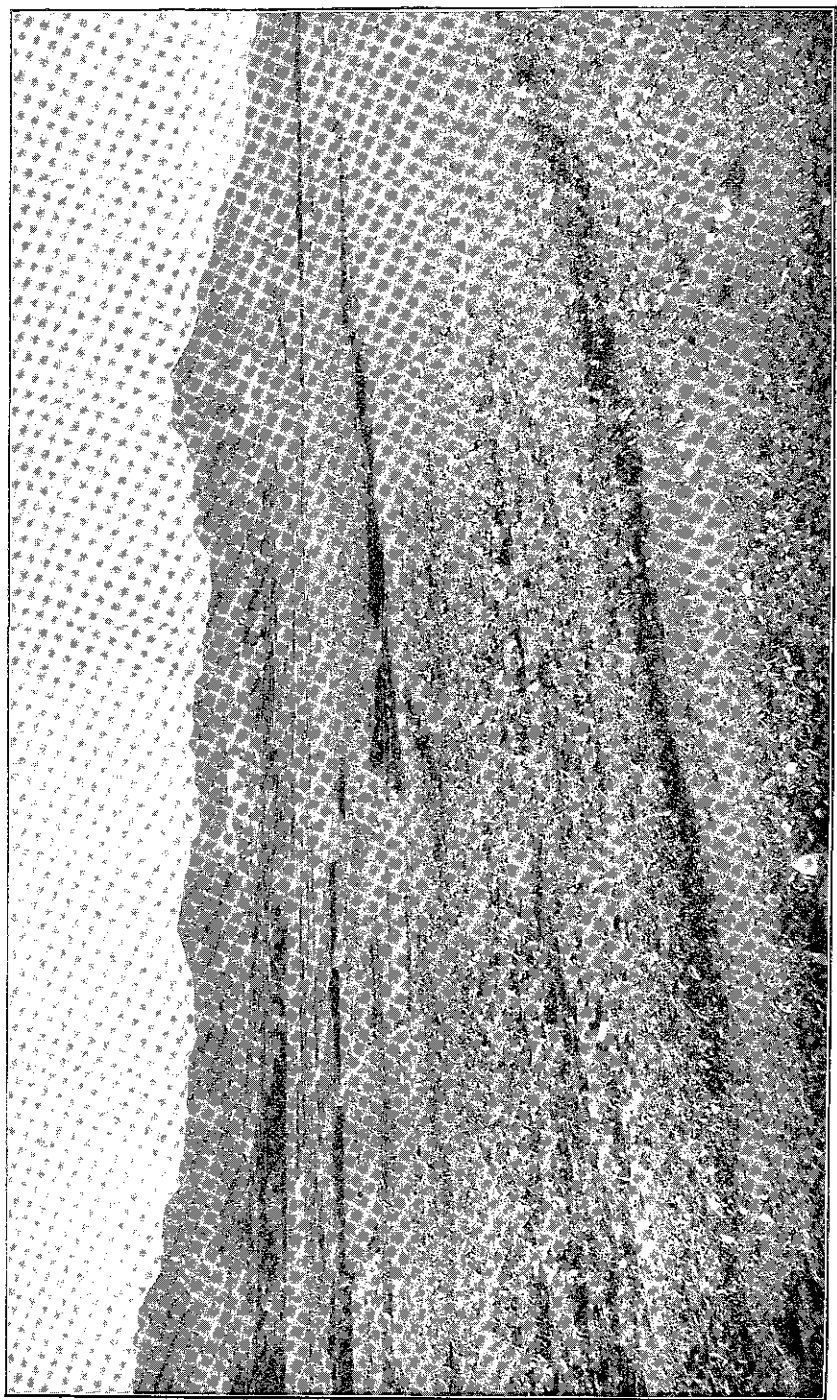
Locality: District of Wu-t'ai-shan, northern Shansi Province, China. Bailey Willis, January, 1904.



No. 6.—Bottom Lands Buried in Waste from the Deforested Mountains  
Locality: District of Wu-t'ai-shan, northern Shan-si Province, China. Bailey Willis, January, 1904.



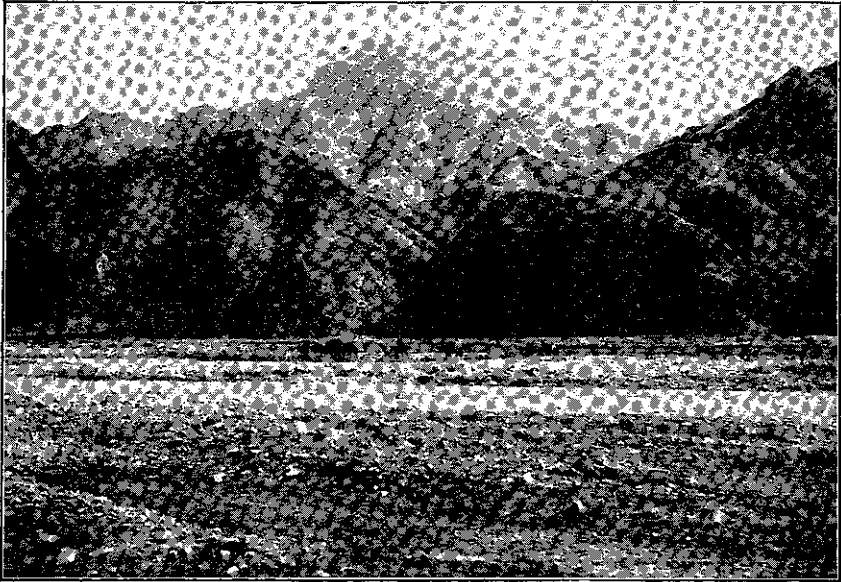
No. 7.—Saving What is Left of the Soil When the Forests are Gone. Artificial Terracing  
Locality: District of Wu-t'ai-shan, northern Shan-si Province, China. Bailey Willis, January, 1904.



No. 8.—Farming in the Path of the Flood

Locality: District of Wu-t'ai-shan, northern Shan-si Province, China. A valley at the base of the mountains which during the spring rains is covered by flood waters. The stone walls catch some of the sediments and crops are grown on the soil thus saved. Bailey Willis, January, 1904.





No. 9.—Caravan Passing Through a Valley Where Formerly Prosperous Peasants Used to Live When the Mountains Were Still Forested

Locality: Near the Wu-t'ai-shan, Shan-si, China. The floods have carried destruction all over the land, and its aspect is like a stony desert. April 14, 1907.



No. 10.—A Pebbly River Bed in South Manchuria

Locality: Near Fong huang sheng, South Manchuria. The formerly big stream has dried up, on account of the climate having become more arid since the destruction of the forests on the mountain sides. Only some scrub wood is left, which will disappear within the next 40 or 50 years. June 27, 1906.