

to his tables and translates the number into the Chinese signs. The tables resemble logarithm tables, the signs being printed in vertical columns and each column containing 20 signs, and as there are 10 columns, there are 200 signs to the page. There are 49 pages to the complete book, consequently there are 9,800 numbered signs. Each square contains a sign for a word. The sender must write his message in Chinese on a blank form; this is then converted into numbers, and they are telegraphed.

The average length of the words is four letters, but the words frequently run to ten or twelve letters.

The postal system of the Empire is still in a primitive condition. It is carried on under the direction of the Minister of War, by means of post carts and runners. There are 8,000 offices for post carts in the eighteen provinces, and there are 2,040 offices for runners scattered over the Empire. There are also many private postal couriers, and during the winter the foreign customs office maintains a service between Peking and the outposts.

THE NEW AGRICULTURE OF THE TROPICS.

The agriculture of the tropics differs widely from that of the temperate zone, but the same general principles of culture, improvement of plants by careful selection, and systematic conversation of the fertility of the soil, apply to both. In the tropics nature is supposed to do most of the work, while the farmers merely plant and harvest. The natives of most hot countries are content to accept this version of farming, and hence live a life of idleness with little thought for the morrow. In spite of their neglect of the trees, vines and plants that yield fruit, they rarely suffer from famine or lack of food, unless their crops be destroyed by hurricanes or floods.

But while tropical agriculture is easily compared with farming in more northern countries, it has never been completely successful without the systematic application of scientific principles. Part of the "white man's burden" has been in the tropics to revolutionize agriculture. Without proper agricultural implements, lacking the means and knowledge to develop the soil and plants, the natives have made no improvement on their antiquated methods.

The possibilities of tropical agriculture are only faintly understood to-day; but an idea of what the future may hold in store for scientific farmers can be gathered from the advances already made by the English, Dutch, German, and Americans in the tropical lands which they have occupied. Before white men settled in tropical America the sugar industry was in the most primitive condition. Machinery for extracting the juice of the cane was unknown, and the plants were semi-wild growths that yielded a very small percentage of sugar. English, American, and German settlers immediately proceeded to develop a higher type of sugar cane, and to invent machinery that would simplify the work of obtaining the sugar. The improvement of the sugar-cane plants and the invention of adequate machinery have added hundreds of millions of dollars of wealth to tropical America, and have given regular employment to the natives.

Rice and cotton are two other typical plants of the tropics which have come under the control of the white farmers. In our own Southern States these crops have been so improved within the memory of the present generation that the yield of every acre has been tripled and the quality of the products improved fifty per cent. The culture of both rice and cotton in the United States by Americans and in Egypt by Englishmen is systematic and intensive. Machinery supplements farm labor, and adds millions of dollars to the value of the crops. The improved cotton plants of to-day represent almost distinct types from those cultivated by the natives in other lands.

The coffee plant originally cultivated by the aborigines of the tropics were inferior producers of a bean so poor in quality that it would now hardly be tolerated in any household. The bean was small and without flavor, and the scraggy plants yielded small, uncertain crops. The Dutch farmers cultivated and improved the plants in Java until a standard was reached which has not yet been surpassed. Brazil abounded in coffee plants, which the natives indifferently cultivated until white men came and showed them how to make their plants grow coffee better in quality and larger in quantity. Brazilian coffee is likely to meet a formidable rival in Porto Rican coffee in the near future if American farmers apply the same care to the development of the crop that they have bestowed upon other tropical plants that have fallen into their hands.

When California and Florida came into our possession we had no territory that was even semi-tropical in climate or products; nevertheless, these two States gave the American farmer an opportunity of showing his skill in tropical horticulture. The wonderful orange groves of the two States, with their abundant crops of the finest fruits in the world, the extensive orchards of olives, figs and nuts, the great vineyards, the ranches and plantations of bananas, lemons, grape fruit, and scores of tropical and semi-tropical fruits,

testify to the skill and success of Yankee farming in tropical or semi-tropical zones.

Fruit-culture in the tropics is at present in the most primitive stage; except in a few notable instances, these tropical products are grown just as nature first produced them. Little or no attempt has been made to double the yield or to improve the quality. The policy of the native farmers has been to do no more than was actually necessary. In view of the changes in the tropical geography of the world wrought by recent wars, the question of the future of the agriculture and horticulture of these lands is rapidly assuming great importance. If the possibilities of the soil and climate under improved culture and the application of farming implements and machinery are all that leading scientists claim, the world's food supply ought to be doubled and tripled in the next decade or two.

According to scientific horticulturists, these improvements will be along two lines. The first will be the improvement and development of the soil so that its utmost capacity can be measured. As in the north, the earth will be fed and not simply robbed of its fertility. An acre of pineapples, bananas, or cocoanuts under a good system of culture should produce twice as many fruits as it does to-day. Modern machinery and farm implements will help the crops in thus utilizing the fertility that has been buried in the subsoil for thousands of years. The loosening of the top soil, and the consequent freeing of the imprisoned nitrogen, should stimulate the growth of the trees and plants so that they will assume a greater size and productivity.

But while intensive methods of agriculture and horticulture in the direct line of cultivating the soil will have marvelous effects, the greatest improvements are looked for in the improvement of the plants and products by careful selection, hybridization, and grafting. Our horticulture owes much to these simple processes. The white men have brought from the tropics plants which have been adapted to cold climates. If the same methods are employed to improve the tropical plants in their own homes the results must be even greater. This has already been demonstrated in the banana, coconut, pineapple, and orange groves of South and Central America. The new plantations of coconut trees in Central America are not only producing larger crops than the old ones, but the nuts are far superior in size and quality. An American syndicate operating fruit farms in Central America has already shipped an improved variety of pineapple north that almost equals the famous London hothouse pineapples. The bananas are so susceptible to improvement that horticulturists do not hesitate to predict that they will soon be produced twice the size of those now imported. But quality as well as size is considered. The development of the "lady finger" bananas is now in course of rapid progress, and this delicate fruit will have a flavor in the future that will be beyond compare.

We are just on the threshold of developing the world's crop of fruits. In the temperate zones the grains, cereals, and cattle have reached a higher stage of evolution than any other products; but the day for the fruits of the tropics is dawning. From South and Central America, from the islands of the Pacific and Atlantic, from equatorial Africa, and from the lands of the Orient, streams of tropical fruits will in the near future pour into Europe and America in return for the cereals, meats, and products of the colder climes. Under modern agricultural methods, an abundance of fruits for the whole world can be raised in these warm regions at a cost so low that none need be so poor as to go without them. The importance of this change of food supply upon our national diet will be of interest to those engaged in the physiological study of the civilized man. With rich nourishing tropical fruits so cheap, our meat diet among the poor, at least, must decline. The effect upon the physical and mental characteristics of the race will be interesting. One of the chief drawbacks to the more rapid spread of vegetarianism is said to be due to the insufficient variety of our common fruits and vegetables. The cultivation and development of the fruit crops of the tropics by white settlers must inevitably tend to remove this restriction.

In the tropics the people are largely vegetarians. It would not be so difficult to spread and popularize the principles of vegetarianism in a land where one's meal might well consist of a dozen different varieties of luscious and nourishing fruits, nuts, and vegetables.

G. E. W.

INDICAN.

Indican may be obtained from indigo leaves in colorless, spear-shaped crystals by treating an aqueous decoction with barium hydroxide, filtering off impurities, and removing excess of the base with carbon dioxide; the filtrate is evaporated to dryness, and the crude residue extracted with methyl alcohol, adding ether to the extract to precipitate the last traces of foreign substances. The solvents are then distilled off, and the final residue dissolved in water, the solution being allowed to deposit the glucoside. It crystallizes with $3H_2O$, melts at $51^\circ C.$, and passes into a gummy mass at

$100^\circ C.$ When dried in a vacuum over sulphuric acid, indican loses its water of crystallization, and then melts at 100° to $102^\circ C.$ Analysis seems to indicate the formula $C_{14}H_{17}NO_6$. The glucoside is moderately soluble in water, acetone or the alcohols, and has a bitter taste. When air is passed through a solution of indican in dilute hydrochloric acid containing a little ferric chloride, 91 per cent of the glucoside is converted into indigotin, a certain amount of indigo red being simultaneously produced.

AS OTHERS SEE US.

The vagaries of American journalism is a favorite theme with the Transatlantic editor, especially at such times as for want of a fresher topic he must fall back upon his list of stock subjects for an inspiration. It is possible that now and then we, on this side of the water, do allow imagination to trespass upon the domain of fact; but never, surely, have we eclipsed the performance of our contemporary. In a representation of the scene of the Hoboken fire, published in one of the leading English illustrated weeklies, the Hudson River is shown to be spanned by two colossal bridges, one at Twenty-third and the other at Fifty-ninth Streets. Where the imagination of the artist received its stimulus we cannot tell—though we might hazard a guess—but certainly this view was not drawn "upon the spot," or even "from a photograph."

The two structures referred to exist only upon paper. That at Twenty-third Street was designed some dozen years ago, by Gustav Lilienthal; the Fifty-ninth Street bridge bears a slight resemblance to the design drawn up by an army board of engineers for a 3,000-foot cantilever, with a view to estimating its cost in comparison with the cost of a 3,000-foot suspension bridge. Badly as these two bridges are needed, the cost is prohibitive; for not even the most sanguine promotor dares to assert that their revenues would cover the interest on the initial outlay of from \$110,000,000 to \$140,000,000 for bridges, real estate and terminals.

THE PRESERVATION OF WILD ANIMALS OF AFRICA.

A convention was signed at London, on May 19, 1900, for the preservation of wild animals, birds and fish in Africa. The contracting parties are the Queen of England, the Emperor of Germany, the King of Spain, the King of the Belgians, the President of France, the King of Italy, and the King of Portugal. The zone within which the provisions of the convention apply is bounded on the north by the twentieth parallel of north latitude; on the west by the Atlantic Ocean, and on the east by the Red Sea and by the Indian Ocean, on the south by the line following the southern boundary of the German possessions in Southwestern Africa. The contracting powers declare that the most effective means of preserving the various forms of animal life existing in a wild state within the zone is the prohibition of hunting and destruction of vultures, secretary birds, owls, rhinoceros, giraffes, gorillas, chimpanzees, mountain zebras, wild asses, white-tailed gnus, elands, and the little Liberian hippopotamus.

The convention also prohibits the hunting and destruction of the young of elephants, rhinoceri, hippopotami, zebras, antelopes and gazelles, ibexes and chevrotains. The killing of the same species when accompanied by their young is also prohibited. Limited numbers of some of the animals may be killed, and lions, leopards, hyenas, hunting dogs, otters, baboons and other harmful monkeys, large birds of prey, owls, crocodiles, poisonous snakes and pythons may be killed. It is prohibited to hunt the wild animals within the zone except by persons who are holders of licenses issued by the local government, which are revocable in case the provisions of the convention are not carried out. Nets and pitfalls for taking animals are not allowed, and dynamite and other explosives must not be used for taking fish. Particular attention is given to hunting and killing young elephants, and all elephant tusks weighing less than twelve pounds are to be confiscated, provided that the animal was not killed before the convention goes into effect. The eggs of ostriches are also protected, but the eggs of the crocodile, poisonous snakes and pythons are to be destroyed. The contracting parties undertake to apply as far as possible, each in their respective positions, measures for encouraging the domestication of zebras, elephants, ostriches, etc. The convention was duly signed in London, and after having been ratified by the powers shall remain in force for fifteen years.

The preservation of animals in Africa will interest all who care for natural history, or for the animals which inhabit the immense forests and deserts of this great continent. Rapacious gatherers of hides or ivory bid fair to exterminate certain classes, and they are assisted in their endeavors by hunters who often shoot innocent, valuable animals in large quantities for mere sport. With proper care Africa can become a great game preserve for the world, where hunters may go and enjoy their pursuit with reasonable chances of success, but the wholesale destruction of animals by either sportsmen or professional hunters is to be deplored.