

acquisitions of the assumed types, but the amount of genius which a reviewer must possess must far transcend this if he can prove that people should learn to think before they can remember anything.

Ten years ago the training of children to work while studying was deemed chimerical. "It had been tried," we were told, "and it had failed." But it had not been tried properly or sensibly. Ten years hence memory and quickness of perception will also be taught to classes of pupils as a preparation for thought. What man has been we all know, but what man may be no one can tell. This only is certain, that Science now holds in her hand, at last, the key to Nature, and that ere a decade shall pass there will be such revolutions as no supernaturalist ever dreamed of.

CHARLES G. LELAND.

TELEGRAPHS IN CHINA.

THE progress of China is by no means so rapid as some interested persons would have us believe, but beyond doubt the empire is at last moving in a direction favourable to the adoption of Western arts and sciences. The simple fact that telegraphs are being provided there is in itself evidence of the wonderful change which has taken place in the past few years in the attitude of the ruling body, and which not even the most sanguine among us could reasonably have anticipated, to go no farther back than the period of the Chefoo Convention in 1877.

When, however, we find it announced that a complete network, as it were, of telegraphic connections is in course of formation there, it may be worth our while to ascertain whether the foundation of this statement is sound and trustworthy; and in making an examination we shall find it convenient to refer to the substantial progress made and the elaborate system which exists, not merely upon paper, but in absolute perfection, no farther away from China than thirty-six hours' journey by steamer.

Japan may indeed lay claim to the possession of a network of telegraphs; and to obtain an idea of the work to be done in China before a similar claim can be established there, we need only reflect that taking mileage and population into consideration the whole of the Japanese Empire could conveniently be deposited within the boundaries of even one of the eighteen provinces of the Flowery Land. To arrive at a basis of calculation, therefore, we should have to multiply the total length of the existing Japanese telegraph lines at least ten times before any comparison could be instituted. If we were to contrast the East and West, which, however, would be scarcely fair, we should find that a telegraphic system as the term is understood in Europe means something yet immeasurably more extensive and intricate.

Casting aside, then, the extravagant impressions which are often conveyed by the brief telegraphic intelligence which reaches us periodically from the Far East, it is matter for congratulation that the outlying provinces of China are gradually being brought into communication with the capital by the aid of electricity. Yunnan, on the extreme south-western border, has recently been connected, and other equally remote provinces will doubtless be reached without loss of time. With millions of labourers ready to work, the guiding and controlling forces, if present in sufficient numbers, might carry on operations simultaneously, if necessary, in all the eighteen provinces. And undoubtedly there will be a decided advantage in throwing up the lines in almost any fashion so long as they can be made to convey a message, if even, as is most probable, the entire system has to be reconstructed at no distant date. The main object is to so familiarize the natives of the interior with the aspect of

these intrusive posts and wires, that they will combine to protect rather than destroy them. And here we are reminded of one point in which the Chinaman differs essentially from his near neighbour the Japanese. When first telegraphs were introduced in Japan, in 1871, the most violent opposition was encountered in the more remote regions at the hands of the agriculturists, who were by no means disposed to acquiesce in all the regenerative projects of the Government of "Benevolence and Light." In China the opposition emanated from the Government itself, inasmuch as considerable diplomatic pressure had to be brought to bear ere the introduction of a telegraph of any kind could be sanctioned, and it is tolerably safe to assume that in the peaceful interior of that vast empire nothing like strenuous objection will be raised to the formation of the line if only it be the aim of the engineers to wound the susceptibilities of the farmers as little as possible in selecting sites for the poles. In Japan the Government was very willing, but the people in many instances were not: in China it has been difficult to convince the Government, whilst the people are eminently docile.

The attitude of ready submission to law and order which characterizes the Chinese farming class affords reasonable ground for the belief that, unless there be a false step on the part of local officials, the telegraphs of China will enjoy an immunity from half the evils which have attended the introduction of the system into other lands. But something will certainly depend upon the policy pursued by the mandarins: it must be one of conciliation. Cultivated land is so exceedingly precious to the Chinese farmer that he can ill afford to have his property disturbed and partly occupied, even if it be to the extent of a square foot or two only, in order that posts may be planted to carry the wires. The system of farming adopted tends to the cultivation of a few acres merely by any one individual, but by diligence and attention a small plot is made to yield practically two and even three crops where one only would be raised in an equal space with us. This is the reason why the good will of the local residents, officials or farmers, will have to be secured.

When these initial difficulties have been overcome, a glorious field will await the development of the telegraphic system. Instead of following in the track of the railway, or journeying side by side therewith, the telegraph will be the forerunner and instigator of improved means of locomotion throughout this immense, almost unknown, region. Even if its effects were limited to the comparatively handy centres of the tea and silk trade there would, in a twelvemonth, be ample justification for its establishment.

It is one thing, however, to have erected a line of telegraph and another thing to provide adequately for its maintenance in efficient working order, without which it would be better not to construct it at all. When communications are interrupted for days together, as must inevitably occur in the absence of a thoroughly complete maintenance organization, the public confidence must be shaken anywhere, and certainly this will apply in full force to China. It is to this most important consideration that early attention should be directed, for the trouble begins the moment the lines are thrown open to the public. When once the merchant has experienced the sensation of being able to complete a bargain on the instant, he is apt to resent fiercely any curtailment of his privileges. It may not be out of place, therefore, to allude to the experience of the pioneers of telegraphy in Japan as evidence of the paramount necessity for establishing this branch of the service on the soundest basis possible. To begin with, testing stations ought never to be farther apart than a day's march on ordinary roads, and trained men are needed at these stations to be held in readiness to set out, on a word from head-quarters, with the necessary tools. Herein is

contained the one essential principle of systematic maintenance. Moreover, it is not enough that breakages of wire be promptly repaired, but the efficient performance of a line-man's duty demands that he should at stated periods patrol his district and remove the possible causes of interruption in the shape of branches of trees and other obstacles to perfect communication before they have time to bring about disaster. His must be the duty of making minute examination of the supports, lest rapid decay at the ground line render even a single post too weak to withstand a sudden shock, and the chain of communication be abruptly severed. He must paint and otherwise preserve these posts, and secure them by the attachment of ample stays against normal or exceptional strains. In a word, a man will find abundant work to fill up his allotted time in a district no more extensive than a day's walking will suffice for him to cover.

Now all this is not mere theorizing, but the relation of what has been done and is being daily carried into effect in Japan, and it is for these reasons that we assert that the Government of that country may claim to possess a telegraphic system worthy the name. At the present time the telegraphic organization extends to every town of any importance within the Mikado's dominions. In the majority of cases these stations are distinguished as being the head-quarters of the local government or prefecture, and all are thus brought into instantaneous communication with the departmental offices at the capital. The four islands are connected by submarine cables, and the Great Northern Telegraph Company's lines form a medium of communication between Nagasaki and the Western world. The Japanese engineer their own service, educate their operators and travelling linemen, manufacture their own apparatus, even of the most complex character, their own batteries, and the galvanized iron fittings for their poles. The insulators in use are of Japanese porcelain, the finest in quality ever produced, capable of withstanding the most severe tests that it is possible to subject them to. Iron poles are not used, because the pine and cedar flourish everywhere, and are obtainable on short notice; moreover, it is often cheaper to replace them, if decay sets in, than to invest in iron, which is costly at the outset, and heavy to transport inland. The rates for telegrams are sufficiently low to bring the convenience within the reach of all classes. Messages are transmitted in either Japanese or foreign languages with equal facility. Finally, the finances of the department are administered in such a way as to show a substantial balance at the end of the fiscal year.

When may we look for this in China?

With the advantages the pioneers of the service there possess we trust we shall not now have to wait long. But it will inevitably be discovered, if the maintenance of the lines be not provided for efficiently from the outset, that a mighty engine of Western civilization is being hampered and thwarted in its progress, and that among the mercantile classes, who ought to be its principal supporters, there will spring up a feeling of distrust which years of success will not entirely counterbalance. There is no reason why China should not manufacture for herself almost everything she requires in the way of apparatus and material, as Japan is now doing; for men of more deft and skilful touch, combined with high intelligence, than the Chinese do not exist. But all their perfection of workmanship will avail the State little if it be not supported by strict perseverance in those duties which appertain to efficient maintenance. Long lines hastily set up across country, with stations few and far between, and without competent workmen to look after them, under substantial control, will soon cease to convey an electrical current. As suggested before, it is one thing to build a line, but quite another matter to preserve it in working order, and it is to be hoped the example of the Japanese will not be lost upon their near neighbours.

J. M.

FLORA OF THE BAHAMAS.

AT the Manchester meeting of the British Association a Committee was appointed, with a grant of £100, for the purpose of exploring the flora of the Bahamas. The vegetation of this group has long been known to present some very peculiar features, but it is poorly represented in European herbaria. The Committee were fortunate in securing the assistance of Baron Eggers (some-time Commandant at the Danish colony of St. Thomas), who had lately returned from an important botanical exploration in St. Domingo.

Baron Eggers started at the end of last year, and the following letter gives an interesting account of the progress which he had made up to the time of writing.

W. T. THISELTON DYER.

Royal Gardens, Kew, February 25.

"Fortune Island, Bahamas, February 6, 1888.

"I finally succeeded in reaching here, and as this part of the Bahama Archipelago most likely is less known still than the islands nearer Nassau, I propose to explore this group (Fortune, Crooked, and Acklins Islands), which are not far from the centre of the whole, and which, especially the two latter, are of a good size and fairly wooded. From the day of my arrival I have been exploring this island, which is of a longitudinal form, 9 miles long by 1 to 2 miles broad, highest elevation 110 feet, entirely covered with a low forest or scrub about 10 to 16 feet high. The largest trees do not exceed 25 feet, and that height is rare.

"Partly on account of the season of the year, partly from the protracted dry weather, some of the shrubs and trees have neither flower nor fruit, whilst at the same time the herbaceous vegetation is almost absent. Yet I have succeeded in finding a good number of most interesting plants in flower or seed, and have made, besides, collections of woods and seeds. Cycads I have seen none of here in this island. *Guaiacum sanctum* seems to be common here. Some very curious composite shrubs I have met with. On the shore *Ambrosia crithmifolia* seems very common, as also *Passiflora pectinata*.

"Of palms are found *Sabal umbraculifera*, and another, probably *Sabal Palmetto*, called palmetto here by the inhabitants, which is common and used for making hats. A shrubby *Phyllanthus* is very common, as also a very small-leaved *Erythroxylon*. *Croton Ujalmarsonii* is frequent. Several species of *Cassia* are found, as also some acacias. One *Psychotria*, a *Phoradendron*, growing on *Byrsonima lucida*, *Swietenia Mahagoni*, two species of *Coccoloba*, a large-leaved *Euphorbia*, a *Cordia*, and a number of other shrubs and small trees. Of Epiphytes I have seen two *Tillandsias* and an *Epidendrum*, which latter grows among rocks. No mosses, but some lichens.

"Among common trees is to be noted chiefly *Hippomane Mancinella*, as also *Conocarpus erecta* in two forms, the glabrous and the silvery-haired ones, both growing indiscriminately together in small woods.

"Almost the whole surface of the island is covered with a layer of limestone, coarse, mixed with sand, about 6 inches thick, which appears to have formed a smooth cover over the whole whilst under water. It is now generally broken to pieces, but the pieces are still close together, and only separated by fissures, in which trees and shrubs grow, sending their roots down into the sandy, and sometimes marly, soil beneath. In many places there are hollows, in which a light red soil has been accumulated, and where a few attempts at cultivation are made.

"As a rule, the only cultivation here is on the sandbank that forms the western shore, and on which also the little town is situated. Here is raised some Guinea corn (*Sorghum*) and sweet potatoes, as well as cocoa-nut trees, which seem to thrive remarkably well. This whole north-