

of the fire-department, and ring a bell there. This would be the signal for the man on watch to repeat the warnings simultaneously through as many local circuits as desirable.

It remains to indicate the way in which the circuit is to be broken by the wind. The circle of telegraph-poles from the south-south-west to the west points would contain about fifty poles. On every one of these the wire would run first to an insulator, then to an iron horizontal axis screwed into the side of the post. On this axis a piece of board one foot square can revolve freely. An iron rod projects below this board, and from the lower end of it a small wire goes to a pin in the telegraph-pole. This pin is connected by wire to a second insulator. From this the line goes to the next pole, and so on. The circuit ordinarily passes to the first insulator, thence to the iron rod, thence down the iron rod to the thin wire, through the pin and to the second insulator, and so to the next telegraph-pole. The thin wire is a necessary part of the circuit. It is so made that it will break when the pressure of the wind on the square board is fifty pounds. The apparatus for each post is tested practically before it is set up. This can be done at any time in a simple manner. Whenever any single one of these boards is subjected to the pressure of fifty pounds, its wire will be ruptured, and the circuit will be broken, thus sending the necessary warning along the whole line.

I have made one such indicator, which is connected with a small bell in this observatory. The wire is arranged so that it breaks at a wind-velocity of about ten miles per hour, and it works in a perfectly successful manner. The extension of the system for the protection of a small town is a simple matter. For a large city a more expensive system would have to be provided, as the wires between poles should be carried underground to protect them from the chance of disturbance.

I need not enlarge on the details of the scheme, since they can be worked out by any one who is at all familiar with electrical constructions. I believe that I have considered all the practical difficulties, and that there are none of any importance. It is a very simple matter to provide for the inspection of the line, bells, etc., so as not to interfere with the working of the system, and so that false alarms will not be given.

The point I wish to emphasize is, that a practical and cheap system of local warnings can be had, and that it ought to be considered by those who live in districts subject to tornadoes.

The particular manner in which the above-described device is to be employed is a question to be settled by the particular circumstances of each case. I have only described the simplest and cheapest form, but this has been proved by trial to be efficient.

I may just mention, that, by employing a spring balance to hold the board in position, it is possible to provide an indicator which will break the circuit at any desired velocity of wind.

To any one who has seen the effects of a tornado, or even to one who has simply read that in this year alone several hundreds of lives have been lost from their violence, it will appear that the question of erecting systems for local warnings ought to be seriously considered by persons living in exposed regions.

EDWARD S. HOLDEN.

THE WILD TRIBES OF LUZON.

WHEN the Malays took possession of the Philippines, they either found there, or were soon joined by, Japanese, Chinese, Siamese, Javanese, and Dyaks from Borneo and Celebes, all waging war against the Papuans, who had gone there from the south-east, if they were not aborigines. Under these circumstances, we should expect to find the present natives a very mixed race, who have received different names, according to the predominating characters in each locality. There is no unanimity of opinion among those who have studied the people in their own homes, and I think it impossible wholly to unravel the tangled skein of races. The following is what, from my observation and reading, I think a fair approximation to the truth.

The name of *Igorrote* has been applied to almost every wild tribe except the Negritos. I agree with Dr. Semper that it should be restricted to those of northern Luzon, who are hybrids of Japanese and Chinese with the Indians, differing somewhat in features and customs, according to the principal admixture.

In the Igorrote the stature is small, with well-developed form, indicating great strength with little symmetry; color very dark; eyes oblique; hair long, and, in the women, combed in Chinese fashion; nose flat, lips thick, mouth large, and cheeks wide. Houses mere huts, on the ground or raised on posts, shaped like a beehive, with furniture of the rudest description, — arms, hatchets, lances, daggers, bows and arrows, frequently poisoned, of bamboo, and shields. Their presence would be accounted for as the descendants of the army of

the Chinese pirate, Li Mahon, whose fleet was destroyed after his attack on Manila in 1574. The fugitives escaped to the mountains; and for more than three centuries these wild hybrids between Chinese and Indian have defied the power of Spain. They have many dialects, but the Igorrote proper is spoken by over ten

habit northern Ilocos. They are of finer shape, lighter color, with less oblique eyes, and more aquiline nose. In their habits, music, and love for porcelain vases, they resemble the Japanese, and have probably descended from the union of crews of junks, driven to Luzon by the northern monsoon, and the neighboring tribes.



IGOROTES OF LUZON.

thousand people. They are not wholly savage, except in the remote mountainous districts. Their customs are simple and patriarchal. It is only of late years that they have consented to bury their dead, instead of exposing them to decay in the air.

The name of *Tinguians* has been given to the hybrids of Japanese and Indians who in-

They number over nine thousand in twenty villages. Their dress and arms are much like those of the Igorotes, but they have borrowed from their enemies the Gaddans the custom of preserving as trophies the heads of those killed in battle. They are said to mummify their dead by heat.

The *Gaddans* and *Ifuagos*, numbering about

ten thousand, resemble in their appearance and customs the Dyaks of Borneo. Many dwell in the provinces of the Camarines, where they have preserved their independence. They have traditions of great antiquity, and speak the Vicol dialect as well as their own. They were evidently here before the Mahometan Malays, by whom they have been driven to

The above-mentioned races are what the Spanish writers call the *infidels*, and may or may not be Igorrotes. SAMUEL KNEELAND.

THE WEATHER IN AUGUST, 1883.

THE monthly review of the U. S. signal-service shows that in August there were two



GADDAN OF LUZON.

the mountains. They are hostile to all foreigners. Their mode of life is patriarchal, the head of a family recognizing no superior authority. From the resemblance of the skulls of some of these wild tribes to those of the people of Sunda, Borneo, and Celebes, and the occurrence of similar ones in the long disused caverns, it seems undeniable that there is among them a considerable Dyak mixture, and that from a very remote period.

features of special note. These are, 1°, the low temperatures which prevailed over nearly the whole country; 2°, the small rainfall, which was below the average in nearly every district. Other important features were a few destructive storms, and the opening of the hurricane season, as will be referred to below.

The pressure has been above the normal, except on the Atlantic coast; the greatest excess, 0.08 inch. occurring in the upper Mis-