

LETTERS TO THE EDITOR.

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Mangroves Growing in Japan.

HAVING resided for some years in the eastern part of Japan, and having travelled from time to time in various parts of the island of Kiusiu, and from thence to the Farther Isles within



FIG. 1.—Thickets of *Kandelia Rheedii*, Wight et Arn., growing together with *Pinus densiflora*, Sieb. et Zucc., found on the sides of a stream at Kiiré in Satsuma, Japan. (Reproduced from an original photograph taken by Prof. K. Mitsukuri.)

the southern boundary of the Luchuan Archipelago, I have noticed that the tropical and sub-tropical types in the Japanese flora are much more marked than has hitherto been supposed. As an instance of this, a selection from the types of mangroves will probably be of more interest, not only to botanists, but also to all lovers of nature, than a list of plant-names.

The northernmost limit of the mangroves in Japan is found in the coast of Kiiré at Satsuma in Kiusiu, where the only species represented is *Kandelia Rheedii*, Wight et Arn. The occurrence of the mangrove in that place is of high interest to geographical botany, inasmuch as that familiar representative of tropical vegetation is found there actually intermingled with that of the temperate flora, *Pinus densiflora*, Sieb. et Zucc. This curious and interesting combination is shown in the accompanying illustrations, which were reproduced from the original photographs by Prof. K. Mitsukuri of the Imperial University of Tokyo. Fig. 1 is a fair representation of an outlet of the stream along the coast in the Bay of Kagoshima. Both sides of the stream are studded here and there with the low thickets of *Kandelia Rheedii*, Wight et Arn., among which the evergreen *Pinus densiflora*, Sieb. et Zucc., stands with its outstretching branches. A little further along the coast discloses a finer view (Fig. 2) of the mangrove, forming dense thickets in front; on the background upon the ridge of the hill, a range of *Pinus densiflora*, Sieb. et Zucc., is seen in the distance.

Coming to the island of Amami-Ōshima, the mangroves are common. Here, besides *Kandelia Rheedii*, Wight et Arn., another interesting species, *Bruguiera gymnorhiza*, Lam., makes its appearance. I may here state that Döderlein was, I believe, the first European botanist who collected these species in Japan (vide *Botanisches Centralblatt*, viii., 1881, p. 30, and

Engler's *Botanische Jahrbücher*, vi., 1885, p. 63).¹ If we proceed again and come to the island of Uchina or the Lūchū Proper, and from thence to the Yayeyama Archipelago, which is situated close to Formosa, we find in these islands an additional species, *Rhizophora mucronata*, L. It is in the Yayeyama Archipelago that the mangroves exhibit their full development. In the island of Irumuti, the largest among the Yayeyama Archipelago, they often exceed ten feet in height, and exhibit the characteristic feature of the "mangrove forests" (*Mangroven-Wälder*) of the tropical coasts, so admirably described by A. F. W. Schimper ("Die indo-malayische Strandflora," Jena, 1891) and by Karsten ("Ueber die Mangrovenvegetation in malayischen Archipel," Cassel, 1891). Besides, *Avicennia officinalis*, L., and *Sonneratia alba*, L., the well-known associates of the mangroves, are now recorded to grow in the Yayeyama Archipelago.

I observed, in the last-mentioned archipelago, that the fruit of the mangroves when ripe, produces, as is well known, hypocotyl, which soon develops and elongates, and that, in *Rhizophora mucronata*, Lam., it usually becomes 20-40 cent. or more, when the fruit drops on the ground and becomes transfixed. I may also confirm the statement made by Warming (in Engler's *Botanische Jahrbücher*, iv., 1883, p. 519) against the well-known notion that in mangroves the roots produced from the ripe fruits on the trees hang down in the air, in the manner of banyan trees, and develop until they reach water, penetrate the mud, and become in time independent trees.

Thus we observe that the three species of the mangroves are at present known to grow in Japan. In conclusion, I may here remark that the thickets of *Kandelia Rheedii*, Wight et Arn., found at the mouth of the river Yawata as well as at the coast between Nukumi and Mayenohama in Satsuma in the Bay of Kagoshima, and also those at Kashiwabara in Ōsumi, all of which being situated between 31° 18'-31° 23' N. lat., are, I think, the northernmost limit hitherto known of Rhizophoraceæ. Tokyo, April 13. TOKUTARO ITO.

The Development of the Tuatara.

IN the last number of the "Anatomischer Anzeiger" received in New Zealand, there is a paper by Dr. Schauinsland on the

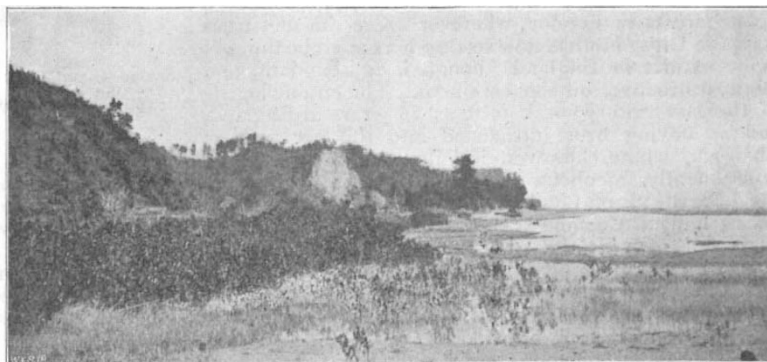


FIG. 2.—View of the coast near Kiiré with the thicket of *Kandelia Rheedii*, Wight et Arn., in front.

development of the Tuatara, confirming the results obtained by Dr. Dendy. A preliminary account of these results has already been published in the *Proceedings* of the Royal Society (vol. lxiii. p. 440), to which Schauinsland makes no reference, although they have been reported in NATURE, while the more detailed memoir was accepted by Prof. Lankester for publication in

¹ The more technical account concerning the determinations of these specimens collected by Döderlein will be published elsewhere.