LETTER TO THE EDITOR.

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Long-tailed Japanese Fowls.

WITH reference to my previous letter on this subject, I should like to draw the attention of the readers of NATURE to a very interesting paper in the *Transactions of the Asiatic Society of Japan* (vol. xxvii. 1900). The writer, Mr. Basil Hall Chamberlain, who has obtained his information from a Japanese fancier, Mr. Kitagawa Ushimatsu, and has also examined the birds himself, states that "there is absolutely no artificial method of making the feathers grow. All is done by selection. Any failure to obtain good results must proceed from having a bad hen, that is, one not of the true breed, and it is in this point that buyers are liable to be deceived. Also one must know how to treat the birds."

The long tail-feathers, Mr. Chamberlain states, grow during the whole life of the bird, which may extend to eight or nine years. If accidentally pulled out they are reproduced. The rate of growth is about four inches a month in young birds, but as much as seven inches in older specimens. The custom of tying up the tail is stated to be a mistaken one, and not to be followed where the birds are bred. The very best specimens are, not unnaturally, kept at home by the breeders in the Tosa province.

The breed is believed to be about a century old, but its origin is unknown. But it seems obvious from the evidence given that it was bred from birds which "sport" in the direction of continuously-growing feathers, as I suggested. Mr. Chamberlain's paper is illustrated by two excellent photographs of cocks of this breed, one of which at least is evidently far superior to the specimens exhibited at South Kensington, remarkable as these are.

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PROF. A. F. W. SCHIMPER.

WILHELM ANDRÉ SCHIMPER, who passed away on September 9 in his forty-sixth year, was the great son of an eminent father. Inheriting from his father, the professor of botany, and from the Abyssinian traveller Schimper, a famous name, he made that name yet more famous.

Schimper studied at the University initially, I believe, with the intention of becoming a mineralogist; and his first paper, on proteid crystals (1879), bears the impress of his special training. But this paper, as well as an early one (issued 1880) on a parasitic flowering plant, *Prosopanche*, has been overshadowed by his later achievements.

It was not until the appearance of his paper on the origin of starch (1880) that the botanical world became aware that a young botanist of power and originality had joined it. Before the appearance of this paper the view prevailed that starch-grains were manufactured either by chlorophyll grains or by the general protoplasm. Schimper showed that starch-grains are invariably produced in specialised masses of protoplasm, in chlorophyll grains, or in colourless "starch-builders." Continuing his researches (1880-1885), he, together with Schmitz, proved that chloroplasts, exclusively by division, arise from preexisting ones (or their homologues), but never by a formation *de novo* from the general protoplasm. Schimper further demonstrated the homology of the three classes of chromatophores—leucoplasts (without colouring matter), chloroplasts (with chlorophyll), and chromoplasts (with red or yellow colouring matter). In fact, while other histologists were showing that the plant-cell and animal-cell had two distinct and individualised kinds of protoplasm—cytoplasm and nucleus—Schimper was demonstrating that a third existed, which, like the other

two, could produce, and only be produced by, its like. In other words all (or at least nearly all) indubitable animals possess in their cells only two completely distinct kinds of protoplasm, whereas all indubitable plants, with the exception of fungi, and possibly some of the lowest vegetable organisms, have three kinds; and it is to the possession of this third kind of protoplasm—chromatophore-protoplasm—that the plant world largely owes its evolution.

But Schimper's investigations on starch-grains incidentally aided in the inception of another, though minor, revolution in botanical thought. When Schimper commenced his work on the origin of starch, Naegeli's theory of growth of the cell-wall by intussusception was firmly held. Schimper's observations and considerations on the growth of starch grains, and some of Schmitz's observations, were the first blows struck at Naegeli's theory, in favour of growth by apposition, and doubtless they stimulated Strasburger to furnish his masterly case in support of the latter view.

Not to adopt strict chronological order, but to follow Schimper's researches so far as they dealt with pure physiology or histology, the next paper, on the conduction of carbohydrates (1885), was of value, as an exhibition of a strict physiological method, and as an appeal against the alluring and facile method of endeavouring to solve physiological problems solely by histological observations, rather than as a paper containing essentially new physiological views. Schimper's two succeeding physiological papers, on the formation of calcium oxalate in leaves (1887), and the assimilation of mineral salts (1890), were of greater importance. They introduced the method of following by microchemical tests the various inorganic elements in their course from the root to the leaves. Apart from serving as admirable and novel models of physiological research, these papers proved that the leaves are no mere workshops for the manufacture of carbohydrates, but that they are in reality perfectly equipped factories in which the rawest food materials can be, and are, worked up into elaborate proteid compounds, and even into protoplasm. Schimper further showed that chlorophyll, in addition to affecting the decomposition of carbon dioxide and the production of carbohydrates, also in some way influences the reduction of inorganic salts and the production of proteids, apparently in a direct manner.

Despite the value of his contributions to our knowledge of the histology and physiology particularly of green cells, Schimper's fame is possibly wider as the founder of a true method of investigating the "politics," "biology," "bionomics," or oecology of plants.

Though Sprengel, Darwin, H. Müller and others had set so excellent an example in their treatment of questions relating to the pollination of flowers, in other departments of the subject the oecology of plants was mainly a motley array of ill-considered hypotheses, vain phantasies and unfounded conclusions, and by serious botanists the subject was derided as the "romance of botany." Schimper inaugurated a new era. In dealing with problems on the relation between plants and their environments, he insisted that the same thoroughness and precision should be exercised as in investigating morphological and physiological questions.

Schimper's first oecological paper, on epiphytes (1884), was a veritable revelation, magic as a fairy-story in interest, but severely reasoned in substance. In this, and in its final version (1891), it was shown that epiphytes were children of the moist forests, and had arisen as beings that had won a victory in the struggle for light by seizing positions of vantage with very little expenditure of material. Commencing as humble occupants of the soil within the shady forest, epiphytes had in the course of ages laboriously clambered up the trees, striving after the light, and ever struggling against the precarious and