

"Land-locked salmon" is admitted to be a race of the true *Salmo salar*, which from some cause having lost its migratory instinct, now lives in lakes, never migrating seawards, while its size is less than that of its sea-going relative. But as the two species are really the same, a cross between a land-locked salmon and a trout in fish-cultivation would be identical with a cross between a *Salmo salar* and a trout.

What then has been the result of attempting the latter cross at Howietown during the last few years? November 25, 1879, this was effected between salmon milt and Lochleven trout eggs; up to now all the offspring have been sterile, none have attempted to spring out of the ponds, and the largest fish among them last year, although in good condition, was only 16½ inches long. On December 24, 1881, this cross was again made, with similar results, the largest fish last winter being about 12 inches long. (Examples are in the South Kensington Museum). Sterility, I may remark, was anticipated from this cross, while it was supposed that such would remove the anadromous instinct, and these results have occurred, but as regards improvement in size, such has not, so far, proved a success.

A cross was made between a young salmon par and a Lochleven trout, on November 29, 1883, but the young succumbed to blue drosy of the sac. This cross was again tried November 14, 1884, when the par was a year older, and so far the young look well, but we can scarcely anticipate their proving fertile offspring. I say "scarcely," for we know that domestication eliminates sterility in some races of hybrids, and in this instance the par had been raised from eggs at Howietown; these have now grown into grilse without descending to the sea, and given eggs. Eggs thus furnished from Howietown-raised grilse have hatched, and several thousand young par are in the establishment, the future of which race will be an interesting study.

I think I am justified in advising that when crossing salmon with trout, not to select a parent from a river or lake, but, if possible, to obtain eggs or milt from a race of salmon which has been two or more generations in a semi-domesticated condition, as with such the probabilities of failure are considerably lessened, but, so far as I have witnessed, hybrids between salmon and trout have proved sterile and undersized.

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Forms of Leaves

IN a recent issue of NATURE, in the discussion on the forms of leaves, Mr. Henslow seems to doubt the assertion of Sir John Lubbock that the holly produces prickly leaves on the lower branches, and smooth leaves without spines above; but this is a fact which may easily be verified in numerous localities (selected gardens varieties are of course not intended). I know of a large tree at Kew which altogether confirms the statement. The explanation, however, that the spines of the lower leaves may be produced to prevent animals from browsing on them, and that they are not developed on the upper branches because these are beyond the reach of animals, seems to me to require some modification, if not to be given up altogether, in this limited sense. It seems to me to admit of a much simpler explanation, namely, that it is an approximation—or reversion, if indeed the term be applicable—to the ancestral type. It is a well-known fact that in the embryonic stage of an organism the affinity with the ancestral type is best seen, and that in the mature stage the greatest amount of specialisation takes place; and, viewed in this light, the case of the holly does not appear to present much difficulty. A young seedling is seen to have very spiny leaves, but with increasing age the leaves becoming comparatively spineless. In the case of the furze we have the most overwhelming evidence that the spiny character has been developed to repel the attacks of herbivorous animals, and a young seedling is seen to have trifoliate leaves—like the laburnum—from which we infer that its ancestral type was spineless, and had trifoliate leaves. The large group of phyllodineous Acacias bear an equally unmistakable stamp of their origin in the bipinnate leaves which the seedlings at first produce. In most cases these leaves are very early superseded by phyllodes, but in *A. melanoxylon* the habit of producing true leaves is never quite lost. There is a large tree of this species about 40 feet high at Kew, at the south end of the Temperate House, close to the spiral staircase. It is thus in an admirable position for examination. At the base of this tree the leaves predominate over the phyllodes, but in ascending the staircase the proportion is seen to gradually diminish, till at the top of the tree—a few feet above the gallery—scarcely a true leaf is to be seen. Assuming the mature stage

to be the more highly specialised, we have in the holly a precisely parallel case. This necessarily involves the opinion that the ancestral type of the genus *Ilex* had spiny leaves; and, if so, it seems highly probable that the character was developed as a protection against the attacks of herbivorous animals. A possible objection which at first struck me was that many of the species have quite smooth leaves; but this has been removed by a search through the specimens in the Kew Herbarium. In the first place, species with spiny leaves occur in each great centre of distribution of the genus—in North and South America, India, China and Japan, the Atlantic Islands, as well as Europe—and in the second, although no seedling plants were found, there are three species which show very spiny leaves on barren branches, and smooth leaves on the more mature flowering branches. These are *I. insignis* and *I. diphyrena*, from India, and *I. Perado*, from the Atlantic Islands. I have little doubt that seedlings of many species would present the spiny character if we could only see them. The presence of spines—the nerves being extended beyond the margin of the leaf—seems to indicate an excess of vascular over cellular tissue; a condition which is either modified with increasing maturity or is not exhibited in the same phenomena. In any case a severe pruning—or reduction of the parts to be nourished—is followed by a temporary reversion to the more spiny character. If this explanation be the correct one the question naturally arises, Why are the hollies losing the property of producing spiny leaves? rather than, Why does the holly produce spiny leaves on its lower branches? The answer to the first query would perhaps be, Because they no longer need the protection afforded by the spines. To the second, Long-continued habits are not often instantly laid aside.

Herbarium, Kew, April 18

R. A. ROLFE

Kite-Wire Suspended Anemometer Readings

HAVING lately made some observations with my anemometers elevated, as above described, at heights above the ground considerably greater than those mentioned in my paper before the British Association last year, I venture to think that a word or two as to the main point at present under investigation, viz. the general increase in the velocity with the altitude at heights between 600 and 1100 feet above the ground, may be interesting to your readers.

Up to June last the greatest altitude reached by the anemometers was 646 feet. I have lately been able to secure readings up to 1129 feet. Taking the average of seven of these, we get the following values for the mean relative velocities at two mean heights:—

Height in feet above ground.	Velocities in feet per minute.
1070	2297
756	2165

When these values are inserted in the formula $\frac{V}{v} = \left(\frac{H}{h}\right)^x$, we get

for the value of the exponent $x = 0.17$, or a little more than $\frac{1}{6}$; but when 500 feet—the elevation of the place of observation above the sea—are added to each elevation, we get $x = 0.26$, or almost exactly $\frac{1}{4}$, which is the value I deduced for the exponent in NATURE (vol. xxv. p. 506), from a discussion of Dr. Vettin's cloud observations.

I would not at present lay much stress upon this coincidence until I have investigated the ratio up to heights of 2000 feet or more, but I certainly think it supports the notion that the formula with this exponent represents the average law of increase at heights over 1000 feet above sea-level.

E. DOUGLAS ARCHIBALD

Temperature of the Body of Monotremata

I HAVE found the temperature of the body of *Echidna hystrix* to be (average of three observations) 28° 0 C., and that of *Ornithorhynchus paradoxus* (two observations) 24° 8 C.¹

These temperatures present a special interest, comparing them with the mean temperature of the body of mammalia in general, which is (after Dr. J. Davy's observations of thirty-one different species) 38° 4 C.

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¹ Details of these observations can be found in the *Proceedings* of the Linnean Society of New South Wales, vol. ix. pp. 425 and 1204.