Year.	Mean change of daily rate in a day.	Difference in two positions.
	Seconds.	Seconds.
1862	1.61	–
1863	1.28	–
1864	1.27	8.21
1865	0.88	6.18
1866	0.74	3.56
1867	0.66	3.57
1868	0.57	2.44

From 1868 the improvement, though well marked, is rather slow. The mean result for the three years, 1879–81, is, —

	Sec.
Mean difference between daily rates on two consecutive days	0.53
Difference of rate when flat and vertical	1.84
Sum of the variations in all four positions	8.23

It would be interesting to know how these numbers compare with the corresponding ones for American watches. But in no other country than Switzerland are the public interests so deeply involved that such data are officially published. We know that the Waltham watches, and probably those of all other American factories, are adjusted with the greatest care, to have, as nearly as possible, the same rate in different positions; but we do not know how near they approach precision, nor how they would stand the test after being a few months outside the factory.

After all, the practical question is not so much how good a watch is it possible to make, as how cheaply can you make a watch of the first class. One has long been able to get as good a watch as could be made from Frodsham or Jurgensen by paying from $300 to $500 for it. What the world has gained by the revolution is the ability to command a watch equal, or but little inferior, to the best, at less than half the old price. Here seem to lie, at the present time, the best grounds for the claim of superiority on the part of the Swiss. I am informed that the best anchor escapement watches, such as those whose performance is given in the preceding table, are sold in gold cases for $120, manufacturer's price: this for watches that cannot be exceeded in quality. Can any American company do as well as this?

The Swiss manufacturers have not been slow to avail themselves of the American system of machinery, but I doubt whether they have been able to bring the system to the perfection which it has attained at Waltham. There are two or three great factories on the American plan; but I have not had an opportunity to visit any of them. Owing to the want of steam and water power, and the habit of having the operatives work at home, only such machinery as each man can manage for himself is available at the great centres. Such is the case at Locle and Chaux-de-Fonds. That this is a great disadvantage can hardly be doubted.

A point which the official Swiss tests do not sufficiently consider is the isochronism of the balance under changes of pressure. The Swiss follow the American plan of dispensing with the fusee and chain, and winding up the mainspring from the centre. A great advantage is thus gained in simplicity of structure and freedom from accident; the frequent breaking of the chain, in former times, having been the greatest source of annoyance to the owners of watches. But, if great accuracy of running is aimed at, we now have the disadvantage that the spring acts with greater force when the watch is first wound up, and that the pressure continually diminishes as the watch runs down. The change of rate between day and night thus arising may exceed the variations from all other causes combined. To avoid this difficulty, each balance and hair-spring has to be adjusted by repeated trial; and the perfection of the adjustment should, in all cases, be one of the subjects of any scientific test. This gives rise to an ulterior question, on which I am not quite satisfied. One carries the most perfectly adjusted watch in his pocket for two or three years, and then has to hand it to a watchmaker to be cleaned and oiled. Will the watchmaker be able to put it together again, in perfect adjustment, without spending on it the same time, trouble, and skill which was originally spent by the maker? If this question is to be answered in the negative, it will practically be a waste of labor to perfect the pocket-watch further without re-introducing the fusee and chain. But in these times, when every one who wants accurate time can get it without trouble, an error of a few seconds a day in the running of a watch will be a less evil than the liability to accident from the breaking of the chain. S. N.

Neuchâtel, March 12, 1883.

THE TAGALS OF LUZON.

THE present natives of the Philippines are generally believed to be of Malay origin, and to have been carried there from the Pacific islands involuntarily by the monsoons, or purposely by migration. They have the same form, character, and habits, as the more barbarous branches of the same race, though of more agreeable and manly features. Those of the southern islands look more like Malays than do the Tagals of Luzon, who are more or

less mixed with Chinese, Japanese, and Negritos. In some islands the Chinese, in others the Japanese, type prevails, according to the proximity of these countries.

They are finely formed, of good stature, copper-colored, with abundant straight, coarse,

TAGALS OF THE PHILIPPINES.

black hair, without beard; head well shaped, but flattened behind; forehead moderate, cheeks prominent, nose flattish, face long, and chin narrow; mouth large, with thick lips, strong teeth, and powerful jaws; chest wide; limbs and feet small, though the great toe is abnormally developed, and almost as prehensile as a thumb; the joints very supple.

Nature supplies the Tagal with rice, fruit, roots, and fish; and his skin is his principal garment. He has, therefore, little inducement to work, and, as a rule, does not, unless from necessity, or to buy some gewgaw; then relapsing into his *dolce far niente* under the palms. Their family ties are close, but peculiar in many of their ideas of what we should call propriety. They are trusty servants, good soldiers and sailors, fertile in expedients, using with much skill their natural advantages. They think little of death, beyond a splendid funeral, and, though nominally Catholics, believe in secret in the superstitions of their race. They chew betel, smoke immoderately, and are very fond of cock-fights and lotteries. Their houses are made of bamboo and canes, thatched with the leaves of the nipa palm, and supported on posts. No nails or tools are required for their construction. All the Tagal needs is his *bolo*, or knife; for the materials are growing all around. I know of no race more independent of the industrial arts. His *bolo* is his only essential implement. His spoon, bowl, and basket he finds in the shell of the cocoanut; his basin, plate, and umbrella, in the leaf of the banana; most of his domestic utensils, in the bamboo; his house, mat, hat, in the various palms. His fruit requires no cooking, and his fish and rice only the simplest. If ever there were a child of nature, the Tagal is one.

The Tagals are noted for their skill in weaving the vegetable fibres of their country, and especially those of the pineapple, hemp, bamboo, palms, and reeds. *Jusi* is raw silk; *seda*, spun silk; hemp, *abaca*, *lupis*, and *sinamay*, which are variously combined in the gauze-like tissues for which these islands are famous. How they make such exquisite fabrics with the rude processes at their command is one of the puzzles which the traveller often meets among semi-civilized peoples.

COSTUME OF TAGAL WOMEN.

The Tagals are the most numerous, best known, least barbaric, and most industrious of the races. They speak a dialect of their own, — the mother-tongue of the others, — and number about 1,500,000. The Visayas of the southern islands are possibly more in number. The islands belong to Spain, and, during her three centuries of occupation, have been very poorly developed. Samuel Kneeland.