the anterior of these to the subopercle. Another spot exists at the shoulder above the gill-opening, and an indistinct one on the edge of the preopercle.

The figure in the magnificent work of the "Fishery Industries of the United States," plate 202, agrees with this specimen in the proportions of the body and length of the fin-rays; but, supposing the species to be the same, differs from it materially in some other points. The position of the dorsal fin is shown too far forward; the scaling is not identical, as the lateral line in Capt. Gray's specimen stands upon a narrow but vertically elongated row of smooth scales, having three rows of smaller ones above it, and four below it; also the eye-like spots are not similarly placed, and the pectoral fin is narrower, with its rays more elongated. FRANCIS DAY

Cheltenham, October 1

The Sense of Smell

WITH reference to Mr. Mitchell's inquiries (NATURE, September 30, p. 521), there is a peculiarity about musk which I have never found anybody to be previously aware of, namely, it is impossible to smell it *twice*, taking two good "sniffs" consecutively at a plant, *i.e.* after a single exspiration; on the second inspiration there is no odour of musk whatever.

GEORGE HENSLOW

Humming in the Air caused by Insects

YOUR correspondent who writes on the above subject in this week's number of NATURE (p. 547) remarks that "It is singular that no explanation has been offered by any one for such a common phenomenon." May I be allowed to refer him to my "Observations in Natural History" (published in 1846), p. 226, where I have given a statement of my own on the subject, adding a reference to Humboldt's "Personal Narrative," in which he makes some remarks on this humming, as heard in the tropical regions, where the phenomena is naturally so much more striking, and on a wider scale.

There can be no doubt the explanation of the phenomenon given by your correspondent is the correct one.

Bath, October 9 LEONARD BLOMEFIELD

THE HONG KONG OBSERVATORY

DR. W. DOBERCK, Government Astronomer at the above Observatory, has recently published an official report on the astronomical instruments under his charge, and on the time service of Hong Kong in 1885, the determination of local time being the chief purpose of the astronomical branch of the institution.

The Report states that the Observatory possesses a transit instrument, by Messrs. Troughton and Simms, of 3 inches aperture and 3 feet focal length. Setting in declination is effected by means of two small circles fixed on the telescope near the eye-end, and read by levels. The axis is perforated for side lamps. The pivots, which are made of chilled bell-metal, show no perceptible difference between their diameters, but minute irregularities appear to exist, though too small to allow their exact amount to be determined by means of the axis level. This level is used in determining the inclination of the axis, and another similar level is provided for use with the zenith micrometer in the observation of differences of zenith distances on either side of the zenith.

The eyepiece was originally furnished with one movable and seven fixed vertical wires, but the latter after a little while began to get entangled with the fixed wires, and finally broke. Although it had been found very useful in the determination of the instrumental constants, it was not thought well to replace it for fear lest the permanent wires might become disturbed or broken by it. Transits were at first observed over all the seven wires, but in 1886 only the five middle wires have been used. There are also two horizontal wires about a minute of arc apart, and the object the transit of which is to be observed, is brought midway between them. The eyepiece and wire system can be revolved through a quarter of a revolution, so that the vertical wires become horizontal, and can be used for determining the differences of zenith distance for latitude; but as the instrument is in constant use as a transit, this arrangement has never been made use of, there being the less necessity for employing it, as Col. Palmer had accurately determined the latitude of the Observatory in 1882.

The telescope rests upon a cast-iron stand with reversing apparatus; no change in the inclination has ever been perceived to be caused by the reversion. The stand rests on a slab of Portland stone on the top of a brick pier sunk 5 feet in the ground, where it is surrounded by a brick cylinder to protect it from surface oscillations.

In 1884 505 transits were observed; in 1885, 313; the inclination of the axis was observed 150 times in the former and 117 in the latter year. A meridian mark, which is viewed through an object-glass of about 66 feet focal length is placed about 70 feet to the north of the transit instrument; another meridian mark is 11,354 feet to the south across the harbour.

The standard sidereal and mean time clocks were supplied by Messrs. E. Dent and Co. The former has a cast-iron back which is firmly screwed to iron bolts cemented in the pier placed in the clock-room. The pendulum has the zinc and steel compensations originally designed for the transit of Venus expeditions. The clock was also supplied with a galvanic contact apparatus omitting one second each minute, for working a sympathetic dial in the transit-room, but as the contact-apparatus was found to interfere with the going of the standard-clock, its use was discontinued early in 1885, and the observations have since been made with a chronometer which is subsequently compared with the standard-clock.

The mean daily rates during ten-day periods of the standard clock are given in a table, and from the rates between January 1 and June 9 the following formula for the rate at t degrees Fahrenheit is deduced:—

$$r = + 1s.{\cdot}247 - 0s.{\cdot}033\,(t - 70^\circ).$$

The clock stopped twice during the year, viz. on June 12 and August 23, each time during a thunderstorm. A difficulty was experienced in the attempt to determine separately the barometric coefficient, since the mean height of the barometer in Hong Kong falls regularly as the mean temperature rises, but it appeared to be insensible.

It should be noted, however, that the mean rates which Dr. Doberck publishes here suggest that the formula given above is only correct within certain limits. The clock would appear to be compensated for 80° or 85°; at least there seems to be no regular variation in its rate about these temperatures, the decline in the rate which accompanies the rise of temperature up to 80° showing a check or even a slight reversal about that point. Probably, however, the mean daily rates cannot be trusted to the degree of refinement to which they are here given. The number of transits observed is decidedly small, and the errors of the transit-instrument do not seem to have been very frequently or regularly determined during 1885. No information is given as to the degree of accordance of the daily rates actually observed.

The mean time clock is similar to the sidereal standard clock, and appears to go as well. It is furnished with galvanic contact springs, which are pressed every hour at the exact second, and send a current through a reversing commutator worked by one Léclanché cell, by means of which the current that drops the time ball at 1 p.m. is closed.

Some trouble has been experienced with the time ball. First the galvanic coil in the mean-time clock-case for setting the clock right before the ball is dropped, is not strong enough, as it takes nearly an hour and a half to correct an error of a second. The lock sent out with the time ball, also, was not fit to drop the ball, the blow of the hammer failing to discharge the bolt, so that the hammer had also to be struck at the instant the current arrived from the clock. The coil was fused by lightning on June 12, and from that date until November 20, the ball was dropped by hand. Since November 22 a new lock has been fitted, which gives satisfaction.

The time-ball tower is erected on Tsim-sha-tsui Point, directly facing the shipping. It stands in front of the new police-station beside the mast for hoisting meteorological signals, at the foot of which the typhoon gun, pointed towards the city opposite, is placed. In the police boat-basin, at a short distance north-west of the tower, the small observatory is built. The time-ball tower is about half a mile distant from the observatory, with which it is connected by wire. The base of the tower is about 40 feet above sea-level, and the top of the ball-mast about 84 feet. On the ground-floor is a massive granite pier, which supports the entire apparatus. Dr. Doberck describes at considerable length the arrangements for dropping the ball, for breaking its fall, and for ascertaining that the fall has taken place at the proper instant, but they do not call for special remark. The accuracy of the time-ball signal at 1 o'clock depends, he says, practically upon the error of the standard clock being accurately determined. If the weather has permitted transit observations to be made the previous evening, the error of course will be pretty closely known; otherwise the regularity of the rate of the standard clock must be trusted to. A table of the errors of the time-ball in 1885 is given, showing that the mean probable error of the signal for each month is about 0·2s.

The time service is at present confined to the dropping of this ball, but there would be, Dr. Doberck points out, no difficulty in dropping any number of time-balls along the coast or distributing hourly time-signals to the principal public buildings, &c.

The observatory possesses three chronometers, the rates of which are here given. Of the three, two keep mean-time, and one keeps sidereal time, but one of the former is useful only as a hack watch.

The equatorial of the observatory is the Lee equatorial, described by Admiral Smyth in the "Speculum Hartwellianum" and the "Celestial Cycle." The great length of the polar axis renders the instrument unsteady and sensitive to every motion of the observer. A Maclean star spectroscope has been fitted to it. The object-glass appears to be still in good condition.

The meteor shower (the Andromedes) of November 27 was observed, and it was estimated that about 2000 meteors an hour were visible, most being small; none being brighter than the first magnitude, and only a few so bright. The radiant was determined to be at R.A. 27°, Decl. 40° N., but it was at least 3° in diameter.

THE RAINFALL OF THE CAPE COLONY

OBSERVATIONS of rainfall were begun in the colony about forty-five years ago, but until 1876 no general system of registration was in force; and, except in the case of the Royal Observatory and a few other stations, no continuous records were available. In 1876, however, Mr. John G. Gamble, M.A., M.Inst.C.E., the Hydraulic Engineer to the Colony, induced the Government to grant a sum of 100*l*. for the purpose of establishing rain-gauges throughout the country. This grant has been continued yearly since then, with the result that, although the sum is quite inadequate for the speedy erection of the number required, there are now 250 gauges from which monthly returns are obtained. A gauge is placed at every seat of magistracy, and private persons are also supplied with gauges free of charge on condition that they observe continuously for five years, and forward monthly returns to the Meteorological Commission at Cape Town. All the services rendered by the observers are gratuitous. The monthly returns are tabulated and printed together with other meteorological observations in a report by the Meteorological Commission, which is presented annually to the Colonial Legislature.

At the end of 1883 there were 75 stations at which records had been kept for at least five years. An appendix showing the average rainfall for each month of the year at these stations was published by the Meteorological Commission in their 1883 report, and in their report of the following year some diagrams plotted from these averages were included, which show more strikingly than figures the fluctuation of the rainfall from month to month.

That the observations begun ten years ago are beginning to bear good fruit is evident from the series of rainfall maps exhibited in the Court devoted to the Cape of Good Hope at the Colonial and Indian Exhibition. There are sixteen maps altogether, fourteen of which have been compiled by Mr. Gamble and two by Mr. W. B. Tripp, F.R.Met.Soc. One of those by Mr. Gamble shows the position of the gauges and the districts into which the colony has been divided for the purpose of rainfall registration; the others represent, by means of different colours, the general distribution of rainfall for each month of the year and for the whole year. The contours on the maps for the various months show differences of 1 inch in the rainfall, starting from a contour indicating the area where the fall is less than 0·5 inch. The contours on the map for the year indicate differences of 12 inches, beginning at 6 inches, and going up to 54 inches. The number of inches of rainfall at the various places is marked in figures.

Mr. Tripp's maps are intended to show the relation between the physical configuration of the country and its rainfall—one map representing contour-levels every 1000 feet up to 4000 feet, and the other representing the mean annual rainfall.

A casual examination of the various maps is sufficient to show that the conditions which determine the rainfall are not the same for the whole of South Africa. Thus in the south-west district of the Western Province the chief portion of the rain falls in the winter months, while in the Eastern Province, and in Natal and the Orange Free State, the greater portion falls in the summer, from October to March. On the southern seaboard of the Cape Colony the rainfall is irregularly distributed throughout the year, the greatest monthly fall at any place varying from one-ninth to one-eighth of the total.

A glance at Mr. Gamble's map showing the distribution in the year, shows that the north-west part of the colony is almost rainless. With the exception of the tract occupied by the Namaqualand Mountains, the average yearly fall in this desert is less than 6 inches; at Pella, a village on the Orange River, the rainfall for the year is 2½ inches, one-fifth of which falls in May. Some of the months at this place are rainless. Throughout the greater part of the colony the yearly rainfall varies from 6 to 18 inches, the smaller falls being characteristic of the regions in the interior, generally known as "The Karroo," from 2000 to 4000 feet above sea-level, and of a plateau nature; while the greater falls are found nearer the sea, and in the mountainous parts. In the south-west district, excluding the Cape Peninsula, and on the narrow strip of country on the south coast, between Swellendam and Port Elizabeth, the yearly rainfall ranges from 18 to 30 inches, except in the forests of George and Knysna, where it exceeds 40 inches. In the Cape Peninsula the rainfall varies from 25 inches at the Royal Observatory to 54 inches on the south-east side of Table Mountain. In the eastern districts of the colony, and in the neighbouring territories, where the main portion of the rain comes in summer, the fall averages from 18 to 30 inches,