0·27 mgrm. of ammonia; that we took 5·5 mgrm. of strychnine and obtained 0·30 mgrm. of ammonia; and that we took 10 mgrm. of sulphate of quinine and obtained 0·45 mgrm. of ammonia.

The absolute errors, therefore, were—

| | Milligrammes of ammonia. Calculated. | Found. | Error. |
|---|---|---|---|
| Papaverine | 0·25 | 0·22 | 0·03 |
| I. Sulphate of cinchonine | 0·48 | 0·57 | 0·09 |
| II. ,, ,, | 0·24 | 0·27 | 0·03 |
| Strychnine | 0·28 | 0·30 | 0·02 |
| Sulphate of quinine | 0·456 | 0·45 | 0·006 |

giving a mean error of 0·035 mgrm.

I have to remark, in reference to these five examples, that they are not cases selected by me to exhibit the accuracy of our process, but cases picked out from a great number, in order to exhibit what takes place under the most unfavourable circumstances. In contrast with these are Frankland and Armstrong's six determinations, five on urea and one on hippuric acid, given by themselves as exemplifying the accuracy of their method, and showing a mean error of 0·35 mgrm. of nitrogen—just ten times as much as ours under the most unfavourable conditions.

I observe you say that the amount of ammonia obtainable from albumen by the action of alkaline permanganate is influenced by the degree of concentration of the solution, the amount of heat applied to the retort, and consequent rate of distillation, and the time to which the solution is exposed to the action of the alkaline permanganate.

It would be just as true and as much to the point to say that the amount of carbonic acid obtainable from sugar depended on the amount of oxide of copper with which it is mixed, and the length of time to which it is exposed to a red heat.

I am able to affirm most positively that there is no difference in the yield of ammonia from albumen, whether the solution be of a certain strength or six times as strong, or whether the distillation be rapid or slow; and in proof of this I refer to a set of experiments on albumen, published in 1867. If the action of the permanganate be pushed to the ultimate limit, the yield of ammonia is constant.

Your assertion that water which has been distilled from permanganate, and gives no reaction with the Nessler test, yields ammonia on being again distilled with permanganate, will not astonish persons who have had experience in the working of our process. The explanation of this fact is now, I believe, tolerably well understood, and is simply this: that when water contains so minute a quantity of ammonia as not to impart a colour when 100 cubic centimetres of it are treated with Nessler test, it may still contain sufficient ammonia to yield a perceptibly ammoniacal distillate if one litre be made to yield 100 cubic centimetres of distillate.

In conclusion, you mention some difficulties in applying our process to the effluent water from sewage farms. I will not, on this occasion, describe how these difficulties are overcome. Suffice it to say that they have been overcome by very simple and obvious means. J. ALFRED WANKLYN

11, Harrington Street, London, June 17

## Parasite of the Beaver

MAY I occupy a few lines of your valuable space for a brief note upon the singular parasite of the beaver, *Platypsylla castoris* Ritsema (*Platypsyllus castorinus* Westwood)?

On the kind application of Messrs. Wayers and Roelofs, of Brussels, Mr. Ritsema very courteously presented me, some months ago, with a pair of this insect, the remarkable characters of which seem to deserve a more extended notice than has been given by himself or by Prof. Westwood, who almost at the same time described it from specimens obtained from a different source.

The former has classed it with the so-called suborder, *Suctoria*, or *Aphaniptera*, as a family or series equal in value to the *Pulicidæ* (fleas, jiggers, &c.), while the latter considered it so peculiar as to represent a new order of insects, which he named *Achreioptera*.

After a careful study of a series of beautiful dissections made for me by my friend the Rev. A. Matthews, I have to dissent from both of these views, and to regard it, in accordance with my impressions at first sight, as *Coleopterous*.

The appearance of the insect is such as to mark it, on the most superficial inspection, as a distinct family. In the wonderful structure of the mentum, with three immense posterior lobes, it shows an affinity, though remote, with the singular genus, *Leptinus*, which is also the type of a family (*vide* Le Conte, Proc. Acad. Nat. Sciences, Philadelphia, 1866, p. 368). But the lateral lobes in *Platypsylla*, broad triangular processes, are in *Leptinus* only narrow spines, projecting in the same manner over the gular plate.

In the form of the antennæ it resembles *Gyrinus* and *Parnus*, and in other less important parts of the body it has unmistakable affinities with various members of the Clavicorn series, such as *Staphylinidæ*, *Silphidæ*, and *Corylophidæ*, though especially with *Trichopterygidæ*, in the very extraordinary genus *Limulodes*, Matthews.

A very rare character is the reception of the antennæ in cavities on the dorsal surface of the prothorax; such characters are found in *Physemus* of the *Byrrhidæ*, *Mychocerus* Er., the affinities of which are doubtful, and in *Usechus* Motsch. of the *Tenebrionidæ*. In those three genera the antennal cavities are round fossæ, while in *Platypsylla* they are grooves extending along the whole lateral margin.

My object in the present note is not so much to express an opinion on the systematic position of this wonderful animal (which I will discuss fully in an illustrated memoir now in preparation), as to call the attention of your readers to the possible occurrence of similar epizoa on other aquatic mammals, especially rodents.

The complex affinities of this genus indicate that it either was in former times, or is at present, a widely distributed type. The European beaver, the capybara, and the musk rat, may, perhaps, when examined, be found to support allied forms.

I will conclude by observing that the insect has no organs with which to perforate the substance of its patron, and cannot eat living tissues or fluids; it is, therefore, not a parasite in the strict sense of the term, but an inquiline, living upon effete material, perhaps epidermal scales. The larva should be diligently sought for by those that have the opportunity, both in the houses and on the bodies of the beavers, as a knowledge of the development and transformations will be of importance in recognising more fully its affinities.

I trust that this note may stimulate further investigation on the part of some of your readers.

Lausanne, June 19 JOHN L. LE CONTE

## Vespertilio

YESTERDAY a neighbour, in cutting down a very old, wide-spreading broadleaf (*Griselinia littoralis*), came suddenly on a great crowd of bats. Whilst he was chopping he noticed that his dog seized something, which he found to be a bat. From a huge hollow limb of the tree seventy-five bats were dislodged; they fluttered into the bush, keeping just above the ground.

Ohinitahi, New Zealand, Feb. 14 T. H. POTTS

## Origin of Cyclones

I HAVE to thank Mr. Whitmee for his statement about the formation of cyclones at the Samoan and neighbouring islands in the latter part of the Southern summer. It will be seen that though I was ignorant of the fact when I wrote in my former letter on cyclones, it confirms my theory that they originate "in the meeting of the trade-winds in the northern and southern hemispheres, at some distance north or south of the equator." The cyclone region in which the Samoan and Fiji islands are situated is probably an extension of that of the Southern Indian Ocean. JOSEPH JOHN MURPHY

Old Forge, Dunmurry, Co. Antrim, June 17

## *THE POPULATION OF THE PHILIPPINE ISLANDS*

ACCORDING to the latest, not yet published, statistics, the Philippine Islands are inhabited by 7,451,352 inhabitants, distributed into 43 provinces and 933 cities or villages. 1,232,544 pay tribute to the Government, and the number of 7,451,352 is calculated on the supposition that about the sixth part of the whole has to pay tribute. As there exist in all the islands, even in Luzon, independent tribes,

and a large number in Mindanao, the number of 7,451,352 gives no correct idea of the real population of the Philippines. This is not known at all, and will not be known for a long time to come.

The number of 7,451,352 is composed in the following manner :—

| | | | | | |
|---|---|---|---|---|---|
| The Island of | Luzon | 4,467,111 | in | 508 | villages |
| ,, ,, ,, | Panay | 1,052,586 | ,, | 92 | ,, |
| ,, ,, ,, | Cebu | 427,356 | ,, | 51 | ,, |
| ,, ,, ,, | Leyte | 285,495 | ,, | 43 | ,, |
| ,, ,, ,, | Bohol | 283,515 | ,, | 36 | ,, |
| ,, ,, ,, | Negros | 255,873 | ,, | 43 | ,, |
| ,, ,, ,, | Samar | 250,062 | ,, | 35 | ,, |
| ,, ,, ,, | Mindanao | 191,802 | ,, | 64 | ,, |
| ,, ,, ,, | Mindoro | 70,926 | ,, | 18 | ,, |

The remainder on the other small islands.

The following is the division into 43 provinces :—

| | | | | |
|---|---|---|---|---|
| Abra | 37,266 | in | 8 | villages |
| Albay | 341,493 | ,, | 38 | ,, |
| Antique | 131,886 | ,, | 19 | ,, |
| Basilan | 600 | ,, | 1 | ,, |
| Bataan | 67,362 | ,, | 12 | ,, |
| Batangas | 432,504 | ,, | 21 | ,, |
| Bulacan | 346,317 | ,, | 24 | ,, |
| Bohol | 283,515 | ,, | 36 | ,, |
| Burias | 2,430 | ,, | 1 | ,, |
| Cagayan | 114,396 | ,, | 19 | ,, |
| Calamianes | 27,189 | ,, | 5 | ,, |
| Camarines North | 42,525 | ,, | 9 | ,, |
| ,, South | 434,016 | ,, | 34 | ,, |
| Capiz | 272,292 | ,, | 32 | ,, |
| Cavite | 173,193 | ,, | 19 | ,, |
| Cebu | 427,356 | ,, | 51 | ,, |
| Cottabato | 1,200 | ,, | 1 | ,, |
| Davao | 1,860 | ,, | 1 | ,, |
| Hoilo | 648,408 | ,, | 41 | ,, |
| Hocos North | 220,038 | ,, | 15 | ,, |
| ,, South | 265,233 | ,, | 21 | ,, |
| Islas Batanes | 12,000 | ,, | 6 | ,, |
| Isla de Negros | 255,873 | ,, | 43 | ,, |
| Isabela | 47,067 | ,, | 9 | ,, |
| Laguna | 216,435 | ,, | 28 | ,, |
| Lepanto | 56,088 | ,, | 81 | ,, |
| Leyte | 285,495 | ,, | 43 | ,, |
| Manila | 354,348 | ,, | 29 | ,, |
| Mashate y Ticao | 17,190 | ,, | 9 | ,, |
| Mindoro | 70,926 | ,, | 18 | ,, |
| Misamis | 100,398 | ,, | 32 | ,, |
| Morong | 73,080 | ,, | 12 | ,, |
| N. Ecija | 167,325 | ,, | 23 | ,, |
| N. Vizcaya | 21,471 | ,, | 6 | ,, |
| Pampauga | 300,567 | ,, | 29 | ,, |
| Pangasinan | 431,691 | ,, | 30 | ,, |
| Romblon | 34,137 | ,, | 9 | ,, |
| Samar | 250,062 | ,, | 35 | ,, |
| Surigas | 73,770 | ,, | 28 | ,, |
| Tayabas | 155,280 | ,, | 17 | ,, |
| Union | 133,452 | ,, | 13 | ,, |
| Zambales | 109,044 | ,, | 23 | ,, |
| Zamboauga | 14,574 | ,, | 2 | ,, |
| | 7,451,352* | | 933 | |

The following division of the Philippine Islands is proposed, but not yet introduced :—

18 Provinces in 3 divisions

1st division.—Manila, Hoilo, Cebu, Hocos, Cagayan.

2nd division.—Pangasinan, Pampauga, Laguna, Cavite, Batangas, Albay, N. Ecija.

3rd division.—Bulacan, Camarines, Capiz, Negros, Leyte, Marianas.

The Islands of Mindanao, Basilan, Tolo (Soolo), Samales, and Balabac, will have a special government.

ADOLF BERNHARD MEYER

Manila, April 15

* The Marianas Islands belong to the Government of the Philippines with 8,000 to 9,000 inhabitants.

## *MINERAL SPRING OF SHANA NEAR TREBIZOND*

THE mountainous and volcanic district, or, to speak more correctly, belt, which skirts the northern coast of Asia Minor, beginning from Amastri, one hundred and fifty miles east of the Bosphorus, up to the Georgian valley and the Russo-Caucasian frontier, abounds in mineral springs, varying as to temperature and constituents, but generally endowed with hygienic properties, which are, to a certain extent, known and appreciated by the natives of the land. But few of these springs have been made the subject of scientific examination and analysis ; so that the ingredients whence they derive their value, where not discernible to the unassisted senses, are in most cases matter of conjecture rather than of demonstration.

In one instance, however, that of a remarkable mineral source within this district, the obligingness of a resident Italian chemist, M. Marengo by name, has lately furnished me with some scientific data, not indeed as complete as might have been desired, yet enough for interesting information. These I will now give, accompanied by my own observations made during frequent visits to the locality in question.

About six miles east of Trebizond on the sea-coast stands the little fishing village of Covata, at the entrance of the valley which, as also the stream that flows down it, bears the same name. Following the valley some way inland towards the mountains where it originates, we come on the water-course and ravine of Shána, falling into that of Covata at nearly right angles, from east to west. "Shána" is, like most names of places hereabouts, a word of Laz, that is Mingrelian, origin, and signifies "heat." This ravine is narrow and deep ; the rocks on either side are volcanic, chiefly mottled tufa of dark grey substance, speckled throughout with small black fragments of irregular shape and size imbedded in it. Vegetation, wherever the steepness of the slope allows it to take root, is most luxuriant ; vines, olives, walnut trees, chesnut, sycamore, maple, poplar, with a dense undergrowth of alder and hazel. Down the bottom of the gorge flows a small torrent, which joins the river of Covata not far from its sea-mouth.

Tracking the narrow path which leads up to the Shána gorge for about four hundred yards, we come on a sort of widening-out, where a horizontal sheet of porous volcanic rocks spreads to some distance alongside of, but slightly elevated above, the course of the torrent. In the middle of this rock-sheet has been formed, partly by nature, partly by art, a small circular basin, nearly three feet in diameter, and averaging a foot or rather more in depth. This is constantly full of clear, limpid-looking water, which wells up through several irregular clefts in the stone bottom of the basin, and overflows it, the waste running off down the ledge into the neighbouring torrent, and leaving everywhere on its passage a thick bright-red deposit of oxide of iron, which stains the rocks, and even discolours the main-stream to some distance. Through the clefts just mentioned bubbles of carbonic acid gas rise in sufficient abundance to give the water the appearance of boiling ; but the temperature is normal. This water is strongly impregnated with free carbonic acid ; its taste is pungent and ferruginous, with a distinct, but, so long as it is fresh, a not unpleasant indication of sulphur. If it is put into a bottle, corked, and exposed to the heat of the sun, the expansion of the gas soon causes an explosion, driving out the cork, and even bursting the bottle.

Near this semi-artificial basin, and placed on a line with it one after another in the axis of the valley, are two other natural rock-hollows, one of several feet in extent, the other less ; whence the same description of ferruginous water, mixed with bubbles of carbonic acid gas,