will; and leave biology as it is for any who may wish to take up that subject. At present the effect can only be to quash the teaching entirely beyond its first and most elementary stage.

There are not wanting signs elsewhere of the evil effects of the younger school of botanists not recognising the importance of first training students in a thorough course of practical and systematic botany before proceeding to laboratory work. In an examination lately held for a post at Kew, I am informed that two gentlemen who had been trained at Cambridge competed with a gardener for the post. The gardener secured it. *Verb. sap.* GEORGE HENSLOW

Animal Intelligence

HAVING frequently observed in your columns accounts of remarkable instances of reasoning power in animals, I am tempted to send you the following notes, which may perhaps be not without interest to the readers of NATURE.

A young canary belonging to our family is in the habit of receiving small pieces of biscuit, cake, or such like from the tea-table. The hardness of the biscuit has ever been a source of great annoyance to Dicky. One day, however, after an expectant and close examination of the tea-table, he was offered a piece of hard biscuit. Without making the least attempt to break it, he lifted it from the floor of his cage, and taking it to his water-trough, gently dropped it in, following up the action by patiently stirring it round and round with his beak, until it was in a condition to be eaten. He then carefully removed it and devoured it without any trouble. He now puts every *hard* substance which he deems eatable into the water. He endeavoured to soften sweets in the same way, but finding that the sweet became gradually smaller and smaller, he hastily abstracted it, and has never since put anything of that nature into the water.

An equally interesting case of reasoning power was lately exhibited by our cat. Pussy had lately become the mother of a family of kittens, and was naturally indisposed after the occurrence. She wandered about through the house in a strange manner, as if seeking for something, always, however, keeping within near range of the coal bunkers when they were likely to be required. With a view to finding out what she wanted, the bunkers were left open. The cat immediately entered, and commenced searching diligently among the coals, until she found a piece covered with pyrites. This she proceeded to lick vigorously, returning to the bunker and repeating the operation at regular intervals. On ground sulphur being offered her, she at once forsok the pyrites for that, and ere long, by use of that medicine, regained her usual health.

R. J. HARVEY GIBSON

Zoological Laboratory, University College, Liverpool,
September 29

In the notes on Australian ants forwarded by me by the last mail I forget whether any mention was made respecting an idea that has struck me several times, as to the method in which the antennæ are employed by ants as a means of communicating with each other. That ants utter no audible sound is pretty plainly proved by experiments made with the microphone. It is said that the *Ambillidæ* give a kind of sharp cry when captured, but the statement requires to be verified. Ordinary ants may be generally spoken of as destitute of any means whereby to utter articulate speech. Beyond the fact that they do not appear to be able to speak, so as to be heard by human ears, the tests resorted to by Sir John Lubbock would go to show that it is extremely doubtful whether ants possess the sense of hearing at all. This, however, does not preclude the possibility, or even the probability, of their being in full power of a means by which they are able to converse. It will be remembered that the antennæ are divided into two separate portions, the *scape* and the *flabellum*. The latter is subdivided into about ten separate segments. Now in this arrangement, by adopting a preconcerted system of signals, all the words of an English dictionary might be expressed.

Let us say that A meets B, and, according to the vocabulary of Formicaria, that a touch with the tip of the antenna of A on the terminal segment of the antenna of B signifies any particular word. A similar touch made on the second segment of the antenna of B indicates another word, and so on. Here there is a means of expressing at least ten different words by taking from the point of the flabellum to its base. If the second

point of the flabellum of A is employed as a touching organ, the number of signs that might be conveyed from the one ant to the other would be twenty. If all the segments were thus utilised, a hundred different signs might be interchanged. This is for one antenna only. By utilising the pair this number would be doubled, and by multiplying the number of touches, to express words or plurals of words, also, and by crossing the antennæ so that the right antenna of A touched the left of B, and *vice versa*, all clearly distinct signals, the vocabulary of these little people would be extended almost *ad infinitum*. Say that the one touch of a segment of the flabellum meant an ant, two touches a pair of ants, and three a multitude; here there exists a means by which complicated ideas might be communicated in a manner somewhat similar to that adopted by the Chinese, by whom a particular sign means a woman, two mischief, and three marital unfaithfulness; or, as in the language of the Australian natives, who employ the term "Yarra" as signifying "flowing," and "Yarra-Yarra" as "ever-flowing." All this would be pantomime, of course; but those who have witnessed a public exhibition of the skill of well-taught deaf-mutes, are aware of the amount of information that can be imparted by the simple use of the ten digits, just half the number of separate conversational organs at the disposal of ants. Nor do persons and nations, well able to speak audibly, fail to avail themselves of the same kind of speech. A Chinaman utters a certain word, but it may mean half a dozen different things, as he moves his fingers to the right or to the left, up or down, or describes some imaginary diagrams in the air.

The above views may seem altogether visionary at first sight, but we have been told so many remarkable stories relative to the instincts displayed by the singularly intelligent creatures under consideration, that no persevering student of their habits will be inclined to say that the use by them of some such code of signals is altogether beyond the range of possibility, even of probability.

It might be as well if naturalists, when watching the meeting of ants, would notice carefully whether the observed touches vary in any particular, and whether any noticeable results followed after, and appeared to be connected with, the variations.

THOMAS HARRISON

244, Victoria Parade, East Melbourne, Victoria,
July 16

Meteors

I HAVE to record a brilliant series of meteors seen last night (Sunday, July 20) by myself and others. I will describe that seen by myself, as, amid the many splendid meteors I have observed during my sixty years of life, I have never seen one more magnificent. I was walking up and down my "quarter-deck," the carriage-drive in front of my house, which faces due north and south, admiring the glorious tints of the dying day, for we have been having, on a reduced scale, the grand sunsets about which I have already written. I was looking due north, and saw a huge fireball suddenly appear about half way between the horizon and the zenith. It moved slowly and horizontally, leaving a broad trail of red light behind it, as well defined as that emitted by a rocket. The meteor itself was about half the size of a full moon, white, and of the most intense and dazzling brilliancy. It travelled so slowly that I had time to call out, *several* times, to my wife, "Look at that glorious meteor," and she had time to turn round and see it. At about north-north-west it suddenly broke up into six, if not *seven* pieces, but at this moment its light was so intense that I could not be quite certain; six, however, I counted *distinctly*. They did not *fall*, but trailed on in a line after the larger mass, which did not seem diminished by the rupture, and finally, at north-west, they all disappeared. On taking out my watch I found it was just two minutes past six, and as we are a month past our shortest day, you can fancy there was plenty of daylight left to dim its splendour. But it was a magnificent sight, and its intense brilliancy surpassed anything I have seen before.

At 6.30 two friends walked up to dinner. I asked if they had seen the meteor. They said, "Yes, how splendid it was!" I asked, "Could you count the number of pieces into which it broke?" They looked at each other in amazement. "It did not break!" "In what direction did it pass?" was my next question. "From west to east," said one of them; "if you were standing here you could not have seen it; it was low down on the southern horizon, behind your house." I then

found on comparing notes that this one, which they both said was large and extremely brilliant, had appeared about *twenty-five minutes past six*.

At night we attended the Governor's last "reception," prior to his leaving the colony. He was handing my wife to her carriage—I was unfortunately in the house—when another fine meteor illuminated the sky. It must have been in the west, or, from the position of the carriage and the buildings, my wife could not have seen it. She says it fell straight down from the zenith, and broke into several pieces. This occurred at 10.45; I had just previously looked at my watch. I also heard of other smaller, though bright, meteors, but did not see them myself. What are we doing, Mr. Editor? Are we going through the tail of a comet? or is cosmic dust igniting? or are these "dire and bloody" portents? Whatever they are, I record them, in the hope that others may have seen and noted them.

British Consulate, Noumea, July 21 E. L. LAYARD

The Milleporidæ

SPECIAL interest is attached to any direct evidence as to the nature of the reproductive organs in the Milleporidæ, the more especially as no traces whatever of such organs have hitherto been discovered. In the absence of any direct evidence it has been concluded that, from the apparent absence of ampullæ, the gonophores probably develop free of the cœnosteum; and this seemed partly borne out by the general resemblance between the zooids of the Milleporidæ and those of the gymnoblastic Hydroids.

On some dry specimens, however, of a new species of Millepora (*Millepora murrayi*, characterised by its extremely laminated and coalescent frond; much and palmately divided at their extremities, and by its minute gastropores, .25 mm. wide, and its still more minute dactylopores and even surface) from the Philippines, there occur, irregularly and numerous distributed among the young branchlets of the cœnosteum, large receptacles, which, though the absence of the soft parts prevents any absolute confirmation thereof, can leave no doubt as to the true ampullate nature of the generative organs in this family. These receptacles occur either closely, or widely apart, as circular cavities in the superficial reticulations of the cœnosteum, and are covered above by a very thin and porous layer, which is often broken away. When it is thus laid open, the cavity is seen to be about .75 mm. in diameter. The receptacles are seen on the surface as white, circular, scarcely raised areas about .5 mm. in diameter, with a small pore in the centre; and they are generally rather numerous placed on one or both faces of the palmated branchlets.

By the discovery of the ampullæ in the Milleporidæ, a complete confirmation is given to the relationship which Prof. Moseley has shown to exist between this family and the Stylasteridæ; and it is seen that the two families are even more closely related than had been imagined. The presence of such a structure seems to bring the Milleporidæ into relationship rather with the calyptoblastic than with the gymnoblastic Hydroids, in spite of the general resemblance of its zooids with the latter.

JOHN J. QUELCH

Natural History Museum, South Kensington

To Find the Cube of any Number by Construction

THE following graphical construction for finding the cube of a number may interest more than the mere mathematician:—

Take a triangle ABC , in which suppose A to be the vertical angle and B greater than C . Draw the perpendiculars AD , BE , CF , thus obtaining the pedal triangle DEF ; take H the middle point of the perpendicular EG on DF . Then $\tan CDH = \tan^3 CDE = \tan^3 A$. If then we take a triangle with vertical angle A such that $\tan A = n$, we see that $\tan CDH = n^3$.

The proof of the above result is quite elementary.

September 22

R. TUCKER

The Failure of the Parsley Crop

WOULD you permit me to ask some subscribers to your paper if it be possible to account for the total failure of the crop of parsley this and last year. Is it owing to any known insect or what? The parsley comes up well, grows to about one inch in height, then begins to dwindle and get yellow, and the whole

summer remains about half an inch high, the only green part being the crown. All the market gardeners are in the same position as myself, only one having a crop, and this was sown in freshly cultivated earth. I have carefully examined leaves and roots under the microscope, but can discover no cause for this disease. Have any of your subscribers been troubled in the same manner, and can any one suggest a remedy? W. H. C. B.

Cheltenham, September 23

Wasps as Fly-Killers

YOUR correspondent at p. 385, vol. xxx., may be informed that in this part of the world wasps enter dwellings by the open windows in summer-time, and hunt house-flies unmercifully, leaving the dead flies in hundreds on the floors, ready to be swept into a dustpan. This occurs only in the country, and where wasps' nests are near by. Westwood quotes from St. John's "Letters to an American Farmer" that: "The Americans, aware of their (wasps') service in destroying flies, sometimes suspend a hornets' nest in their parlours" (Introduction to "Modern Classification of Insects," ii. p. 246, foot-note).

GEORGE LAWSON

Dalhousie College, Halifax, Nova Scotia, September 8

GEORGE BENTHAM

WE recently announced the death of the veteran botanist, George Bentham, when within a few days of his eighty-fourth birthday. His life, from a very early age, was one of incessant mental activity, and of much change and vicissitude during its three or four first decades. Through his birth, connections, and various residences on the continent of Europe, as well as in England, he became acquainted with many men famous in literature, science, and art, and his career is rendered especially notable from its intimate association with his uncle Jeremy, the jurist, in the arrangement of whose papers and preparation of whose works for the press he was actively engaged for not a few years, and with whom he resided on the most intimate terms as companion and secretary till the death of that relative in 1832. This and the scientific value now attached to the "pedigree" have suggested the expediency of entering with some detail into the family history and early life of Mr. Bentham (for most of which we are indebted to information imparted by himself) before detailing his botanical career and writings.

About the year 1750 Jeremiah Bentham, an attorney or solicitor, one of a family of scribes who, as fathers and sons, had inhabited the Minories since the beginning of the seventeenth century, migrated to the West End of London, purchasing property in Queen's Square Place and Petty France (now York Street, on the south side of Birdcage Walk, St. James's Park). He had two sons: the elder, Jeremy, the well-known writer on Jurisprudence, the younger, Samuel (subsequently Sir Samuel), father to George, the botanist. Samuel devoted himself to the study of naval architecture, and at the age of twenty-two visited the arsenals of the Baltic for the purpose of improving himself. From thence he travelled far into Siberia, and became intimate with Prince Potemkin, who induced him to enter into the service of the Empress Catherine, at first in a civil, and afterwards in a military, capacity. In the latter he took a distinguished part in a naval action against the Turks on the Black Sea. For this he received the Cross of St. George, and was given the command of a regiment quartered in Siberia, which enabled him to penetrate eastward to the frontier of China. After ten years of absence he returned to England, and was shortly afterwards promoted to the rank of general. The death of Catherine followed soon after, when he was offered employment in England by his friend Earl Spencer, then First Lord of the Admiralty, who was anxious to avail himself of Gen. Bentham's ingenuity and experience in