

felt, and, besides, his mathematical tastes would naturally incline him, of the two, to take up electricity rather than geology.

It is lamentable to think that this radical change, by which science is virtually shelved, is solely due, as the Duke of Cambridge said, to a desire on the part of the authorities to eliminate the "crammers," and get boys passed into Sandhurst and Woolwich direct from the public schools.

Now, however desirable the approximation to such an ideal may be to the authorities, or even the public schools, it is very questionable whether it will prove equally desirable for the service, unless indeed means are taken to insure that the schools will do their work more efficiently than heretofore. This is scarcely likely to be accomplished by cutting science or even English literature out of the scheme, under the pretence that such subjects admit of being "crammed." The truth is that in these points the authorities have simply pandered to the present inability of the schools to teach these subjects successfully. Nor is it likely that the schools will be any more successful in the teaching of French and German up to the new standard, than they have been up to the old. In this, as in everything else, the tutors by the new scheme are really left masters of the situation.

Why do not the authorities accept what the Marquess of Salisbury maintained was inevitable so long as competitive examinations existed, and instead of attempting the impossible task of uprooting the tutor, place him on a recognised official footing, give him in place of the prestige which efficiently insures the maintenance of discipline at the large public schools, the protecting ægis of a few simple rules which every tutor would be obliged to enforce, and the breach of which would render the offender liable to be denied entrance into the service? This would correct the evils which are prevalent at some of our larger army "coaching" establishments, and then there need be no reason for the pretence under which a candidate is supposed to be better fitted for life by a total ignorance of science and the literature of his own country, in lieu of which, like a parrot, he has been taught to chatter one or two foreign languages.

Tunbridge Wells, July 1 E. DOUGLAS ARCHIBALD

Animal Intelligence

HAVING noticed some time ago a number of letters in NATURE on the above subject, I venture to publish an instance, which came under my own observation last month, of extraordinary intelligence in a rat. I was standing in the doorway of a large shed, the further end of which had been partitioned off with bars to form a fowl-house, when I was attracted by a gnawing and scraping noise; turning round I saw a rat run from a large dog-biscuit which was lying on the floor, and pass through the bars. Being curious to watch if he would return, I kept quiet, and presently saw a well-grown specimen of the "common brown rat" (*Mus decumanus*) come cautiously forward, and after nibbling for a short time at the biscuit, drag it toward the bars, which are only two inches apart, and would not allow the biscuit to pass. After several unsuccessful attempts he left it, and in about five minutes returned with another rat, rather smaller than himself. He then came through the bars, and, pushing his nose under the biscuit, gradually tipped it on edge, rat number two pulling vigorously from the other side; by this means they finally succeeded in getting a four-inch biscuit through a two-inch aperture. Not feeling pleased that my dog's biscuits should be used as food for rats, I threw a hammer at them and picked up the biscuit.

I think the conduct of these animals showed a wonderful amount of intelligence; it was evident that the first rat saw that to get the biscuit through the bars it was necessary that it should be on its edge, and, not being able to tip it and pull at the same time, he gained the assistance of a friend.

The short space of time during which he was absent, and the concerted action, show also that they must have some wonderfully facile means of communicating ideas.

T. W. KIRK
Colonial Museum, Wellington, New Zealand, May

ABOUT twenty miles from this, in the town of Larne, there resides a gentleman in the possession of a cat, which is so great a favourite that every day a plate and chair are placed for her beside her master, whose repast she shares with supreme content.

One day for some reason the dinner was postponed, but the cat came in at the usual hour. She was evidently much discon-

certed at seeing nothing going on, walked once or twice disconsolately round the table, then disappeared. Shortly afterwards she returned with a mouse, which she laid on her master's plate, then going away, she came back a second time with a mouse, which she put on her own plate. She postponed further proceedings until her master returned, when she immediately began to purr and rub herself against his legs, as much as to say, "See how nicely I have provided for you."

Between this town and the village of Holywood there is a country house which happened to take fire last week. The cat of the house, which had access to the servant-maid's apartments, ran up and pawed the young woman's face. Being very drowsy, the girl turned to sleep afresh. The cat, however, after some interval returned, and proceeded to scratch the girl's face to such purpose that she rose, and, smelling the fire, wakened the other members of the household, and the flames were extinguished.

A nephew of mine who is fond of cats generally keeps three or four, and by dint of pains and kindness teaches them a variety of tricks. I saw one of them sipping cream from a teaspoon, which it held between its two forepaws. I might relate quite a number of other particulars about cats, but do not like to trespass further on your space. The foregoing, along with the other details which I have already furnished, are perhaps not unworthy to be placed beside the interesting particulars narrated by the younger Cuvier and Mr. Romanes in reference to the intelligence of animals.

HENRY MACCORMAC

Belfast

Butterflies as Botanists

THE caterpillars of *Mechanitis*, *Dircenna*, *Ceratinia*, and *Ithonia* feed on different species of Solanaceæ (*Solanum*, *Cyphomandra*, *Bassovia*, *Cestrum*), those of the allied genus *Thyridia* on *Brunfelsia*. Now this latter genus of plants had been placed unanimously among the Scrophulariæ, till quite recently it was transferred by Bentham and Hooker to the Solanaceæ. Thus it appears that butterflies had recognised the true affinity of *Brunfelsia* long before botanists did so.

There is yet another and more curious instance of our butterflies confirming the arrangement of plants in Bentham and Hooker's "Genera Plantarum." *Ageronia* and *Didonis* were formerly widely separated by lepidopterists, being even considered as constituting distinct families, but now they are to be found beside one another among the Nymphaliniæ, and the structure of their caterpillars leaves no doubt about their close affinity. The caterpillars of *Ageronia* feed on *Dalechampia*, those of *Didonis* on *Tragia*. Now these two Euphorbiaceous genera were widely separated by Endlicher, who placed the former among the Euphorbiæ, the latter among the Acalyphæ; Bentham and Hooker, on the contrary, place them close together in the same sub-tribe of Plukenetiæ, and thus their close affinity, which had been duly appreciated by butterflies, has finally been recognised by botanists also.

Fritz Müller
Blumenau, Santa Catharina, Brazil, June 1

Christian Conrad Sprengel

WILL you allow me a short reply to Prof. Hagen's letter published in NATURE (vol. xxix. p. 572)? It is evident that Prof. Hagen's statements are very far from proving what he asserted in his former letter, viz. that between 1830 and 1840 Sprengel's discoveries were known to every student in Prussia, and I think it would be easy to any one resident in Germany to prove the contrary by simply confronting what the manuals of botany published at that time say about the fertilisation of flowers. Thus, as I learn from Delpino's "Ulteriori Osservazioni" (p. 88), Link ("Elem. Philos. Bot.," ii. 1837, p. 222) and Treviranus ("Physiol. der Gew.," ii. 1838, p. 343), both of whom, according to Hagen, were entirely acquainted with Sprengel's discoveries, adopt Cassini's erroneous view of the fertilisation of Campanula being effected through the collecting-hairs of the style instead of through the stigmatic papillæ; and this must have been almost impossible for any one acquainted with Sprengel's excellent account of *Campanula rotundifolia* ("Entdeckte Geheimnisse," p. 109). What Prof. Kunth, in his lectures at the Berlin University, taught about the fertilisation of flowers may be seen in his "Lehrbuch der Botanik" (1847, p. 422). Almost every line contains errors splendidly and convincingly refuted by Sprengel. Thus he considers as contrivances serving