

At the Zoological Gardens I have seen a small monkey hold out to me a nut to crack which was too hard for him to crack himself, and the conflict of emotions with which he held out, again withdrew, and eventually surrendered his treasure was positively painful to witness. Of course I cracked the nut, and Prof. Huxley tells me that he once performed a similar act of charity under precisely similar circumstances. Now the process of "mental reflection," which led to this surrender by the monkey of his valued property must have been both vivid and complex.

Although I have never myself observed an instance, I can have no doubt from the concurrent and independent testimony which I have received that dogs are sometimes capable of reasoning thus: Is my master out or not? When he goes out he always takes his great-coat with him; therefore I will go and see whether or not his great-coat is hanging in its accustomed place.

Lastly, I have just received a letter from the Vicar of Carn, which relates an instance of mental reflection on the part of a poodle dog that has the merit of admitting neither of mal-observation nor unconscious exaggeration. The vicar's friend—a Canon whose name I have at present no express permission to publish—went to visit a cousin, who owned the poodle dog. I will conclude by telling the rest of the story in my correspondent's own words: "The poodle, whose name is Mori, went into the dining-room with them, and kept quietly under the table till the end of lunch, when he begged for a little food, and he was given a small shred of beef. They returned to the drawing-room, while the servant cleared away, and the beef was taken into the larder. The dog did not think he had had his fair share. . . . Now, he had been taught to stand on his hind legs, put his paw on a lady's waist, and hand her into the dining-room. He adopted the same tactics with my friend the Canon, . . . but the sagacious dog, instead of steering for the dining-room, led him in the direction of the larder, along a passage, down steps, &c., and did not halt until he brought him to the larder, and close to the shelf where the beef had been put." [After giving him a piece of beef, the Canon went upstairs and refused again to be led down as before.] "Finding he could not prevail on the visitor to make a second excursion to the larder, he went out into the hall, took in his teeth Canon's hat from off the hall table, and carried it under the shelf in the larder, where the coveted beef lay out of his reach. There he was found with the hat, waiting for its owner, and expecting another savoury bit when he should come for his hat."

GEORGE J. ROMANES

NOTES ON THE FAUNA OF THE SOLOMON ISLANDS

AT a late (January, 1879) meeting of the Linnean Society of New South Wales Mr. E. P. Ramsay, F.L.S., &c., read a paper on the Zoology of the Solomon Islands, the subject of this paper being a large collection of mammals and birds collected at Gaudalcana, Savo, and Cape Pitt by Mr. James Cockerell, a well known Australian collector. The collection was obtained from Capt. Brodie, of the schooner *Ariel*, who had made arrangements with Mr. Cockerell to collect in the islands. Among the novelties described we find two species of *Monarcha*: (1) *M. barbata*, with elongated black plumes from the throat, belonging to the *M. loricata* and *M. leucotis* section; (2) *M. rufocastanea*, black above, deep chestnut rufous below; (3) a *Sauloprocta*, *S. cockerellii*, black above and as far as the breast, which is striped with white and with the abdomen and under tail-coverts white; two species of *Myiagra*, (4) *M. ferocyanea*, of a beautiful clear steel-blue black above and on the throat, the remainder of the under surface white; (5) *M. pallida*, ashy blue above, white below, tail chiefly pale rufous; (6) a fly-catcher, allied to *Rhissidura rufifrons*, but distinct in

being smaller and having much more rufous on the head and less on the tail, has been named *R. rufifrons*; (7) a curious little sun-bird, *Cinnyris melanocephalus*, having a black head and the remainder of the body dull olive yellow above, brighter yellow below; (8) a *Pseudorectes*, of a rich cinnamon colour, with whitish throat, and yellow crissum and ochre-yellow under tail-coverts, is called *P. cinnamomeum*; and (9) a *Calornis* of a uniform bright steel-green colour, with a sharply ridged keel-shaped culmen, but otherwise resembling *C. cantor*, is named *Calornis solomonensis*.

In addition to the new species, the collection contained some of great interest to ornithologists, particularly a beautiful series of the rare *Lorius cardinalis*, and *Halcyon leucopygia*, of which the female only was previously described. A var. of *Halcyon chloris* is also described, which differs from Mr. Sharpe's plate (Sharpe, "Monog. Alced.," pl. 87) in having the whole of the under surface rich buff, the under wing-coverts of a deeper tint. There is also a large series of *Megapodius brenckleyi* (Gray), adults and young, and quite a number of *Dicaeum erythrothorax*. Among the pigeons *Carpophaga rufigula* (Salvad.) is conspicuous from its peculiarly formed cere, also another large species allied to or identical with *C. van-wickii* (Cass.). A var. of (?) *Ptilopus viridis* is described, also *P. superba* from the same place.

The following is a complete list of the species recorded and their habitats:—

	Locality.
1. <i>Astur soloensis</i>	Cape Pitt.
2. <i>Baza stenozoa</i>	Gaudalcana.
3. <i>Ninox</i> "	"
4. <i>Cacatua ducorpsii</i>	Savo.
5. <i>Lorius cardinalis</i>	Savo and do.
6. " <i>chlorocercus</i>	"
7. <i>Geoffroyius heteroclitus</i>	"
8. <i>Electus polychlorus</i>	"
9. <i>Centropus milo</i>	Gaudalcana.
10. <i>Cuculus taitensis</i>	Savo.
11. <i>Chalcites plagosus</i> (?)	"
12. <i>Eurystomus crassirostris</i>	Cape Pitt.
13. <i>Eulabes krefftii</i>	"
14. <i>Calornis metalica</i> (?)	Savo.
15. " <i>solomonensis</i> , sp. nov.	"
16. <i>Sturnoides fulvipennis</i>	Gaudalcana.
17. <i>Graucalus hypoleucus</i>	"
18. " " sp. nov.	"
19. <i>Edoliisoma</i> (?) <i>plumbeum</i>	"
20. <i>Tachycephala orioloides</i>	"
21. <i>Pseudorectes cinnamomeum</i> , sp. nov.	"
22. <i>Monarcha barbata</i> , sp. nov.	"
23. " <i>rufocastanea</i> , sp. nov.	"
24. <i>Sauloprocta tricolor</i>	"
25. " <i>cockerellii</i> , sp. nov.	"
26. <i>Rhissidura rufifrons</i> , sp. nov.	"
27. <i>Myiagra ferocyanea</i> , sp. nov.	"
28. " <i>pallida</i> , sp. nov.	"
29. <i>Cinnyris melanocephalus</i> , sp. nov.	"
30. " <i>frenata</i>	"
31. <i>Dicaeum erythrothorax</i>	"
32. <i>Halcyon leucopygia</i> , Ven.	"
33. " <i>chloris</i> , var.	Cape Pitt.
34. " <i>sanctus</i>	Savo, &c.
35. <i>Carpophaga rufigula</i> , Salvad.	"
36. " <i>van-wickii</i> , Cass.	Gaudalcana.
37. <i>Ptilopus viridis</i> , var.	"
38. " <i>superbus</i> , Temm.	"
39. <i>Chalcophaps chrysochloris</i> , var.	"
40. <i>Macropygia</i>	Savo.
41. <i>Megapodius brenckleyi</i>	"
42. <i>Butoroides javanica</i>	"
43. <i>Herodias garzetta</i>	"
44. <i>Sula personata</i>	"
45. <i>Sterna bergerii</i>	"
46. " <i>gracilis</i> , Gould	"

In addition to the birds Mr. Cockerell obtained in quantity two species of Pteropus, two varieties or perhaps species of *Cuscus*, a species of *Harpyia*, a new Chiero-

pteruges, and a *Macroglossus*, also a species of *Scotophilus*, probably *S. nigrogriseus*, Gould.

The fishes were not numerous, but some interesting species were obtained, respecting which the Hon. Wm. Macleay read some remarks which will be published in due time.

The insects, about fifty species, will also we hope be taken up by Mr. Macleay. Among the spiders are some very interesting forms, apparently quite new.

The collection of birds numbers about 350 specimens, the mammals about 120. Spirit specimens about 100.

We believe a large portion of this fine collection has been secured by the curator, Mr. E. P. Ramsay, F.L.S., for the Australian Museum.

THE SORTING DEMON OF MAXWELL¹

THE word "demon," which originally in Greek meant a supernatural being, has never been properly used to signify a real or ideal personification of malignity.

Clerk Maxwell's "demon" is a creature of imagination having certain perfectly well-defined powers of action, purely mechanical in their character, invented to help us to understand the "Dissipation of Energy" in nature.

He is a being with no preternatural qualities, and differs from real living animals only in extreme smallness and agility. He can at pleasure stop, or strike, or push, or pull any single atom of matter, and so moderate its natural course of motion. Endowed ideally with arms and hands and fingers—two hands and ten fingers suffice—he can do as much for atoms as a pianoforte player can do for the keys of the piano—just a little more, he can push or pull each atom *in any direction*.

He cannot create or annul energy; but just as a living animal does, he can store up limited quantities of energy, and reproduce them at will. By operating selectively on individual atoms he can reverse the natural dissipation of energy, can cause one-half of a closed jar of air or of a bar of iron to become glowingly hot and the other ice-cold; can direct the energy of the moving molecules of a basin of water to throw the water up to a height and leave it there proportionately cooled (1° Fahr. for 772 feet of ascent); can "sort" the molecules in a solution of salt or in a mixture of two gases, so as to reverse the natural process of diffusion, and produce concentration of the solution in one portion of the water, leaving pure water in the remainder of the space occupied; or, in the other case, separate the gases into different parts of the containing vessel.

"Dissipation of energy" follows in nature from the fortuitous concourse of atoms. The lost motivity is essentially not restorable otherwise than by an agency dealing with individual atoms; and the mode of dealing with the atoms to restore motivity is essentially a process of assortment, sending this way all of one kind or class, that way all of another kind or class.

The classification, according to which the ideal demon is to sort them, may be according to the essential character of the atom; for instance, all atoms of hydrogen to be let go to the left, or stopped from crossing to the right, across an ideal boundary; or it may be according to the velocity each atom chances to have when it approaches the boundary: if greater than a certain stated amount, it is to go to the right; if less, to the left. This latter rule of assortment, carried into execution by the demon, disequalises temperature, and undoes the natural diffusion of heat; the former undoes the natural diffusion of matter.

By a combination of the two processes, the demon can decompose water or carbonic acid, first raising a portion of the compound to dissociational temperature (that is, temperature so high that collisions shatter the compound

molecules to atoms), and then sending the oxygen atoms this way, and the hydrogen or carbon atoms that way; or he may effect decomposition against chemical affinity otherwise, thus: Let him take in a small store of energy by resisting the mutual approach of two compound molecules, letting them press, as it were, on his two hands, and store up energy as in a bent spring; then let him apply the two hands between the oxygen and the double hydrogen constituents of a compound molecule of vapour of water, and tear them asunder. He may repeat this process until a considerable proportion of the whole number of compound molecules in a given quantity of vapour of water, given in a fixed closed vessel, are separated into oxygen and hydrogen at the expense of energy taken from translational motions. The motivity (or energy for motive power) in the explosive mixture of oxygen and hydrogen of the one case, and the separated mutual combustibles, carbon and oxygen, of the other case, thus obtained, is a transformation of the energy found in the substance in the form of kinetic energy of the thermal motions of the compound molecules. Essentially different is the decomposition of carbonic acid and water in the natural growth of plants, the resulting motivity of which is taken from the undulations of light or radiant heat, emanating from the intensely hot matter of the sun.

The conception of the "sorting demon" is purely mechanical, and is of great value in purely physical science. It was not invented to help us to deal with questions regarding the influence of life and of mind on the motions of matter, questions essentially beyond the range of mere dynamics.

The discourse was illustrated by a series of experiments.

PAOLO VOLPICELLI

THIS eminent Italian physicist, whose death we recently recorded, was born at Rome on January 8, 1804. He lost his mother a few days after his birth; his father was Prof. Alexander Volpicelli, a member of the Medical College of the Roman University. Paolo was educated at the college of Veroli and the University of Rome, where, in accordance with the wish of his father, he commenced the study of medicine, but abandoned it after the first year, declaring that medicine was not a science. Of his own accord he applied himself seriously to the course of mathematical philosophy, and four years later received the degree of doctor *ad honorem* in that faculty. It should be mentioned that doctorates *ad honorem* are given to only two students each year, and Volpicelli's fellow-doctor was the eminent Professor Tortolini, who followed the same course. Before leaving the University his professors recommended him to the Government for a scientific position. In fact, Prof. Morichini wished to name him his successor to the Chair of Chemistry in the University of Rome, but Volpicelli preferred to succeed Dr. Barlocci, Professor of Experimental Physics in the same University, and in 1845, on the death of Barlocci, became titular professor. Volpicelli occupied this chair till 1873, when he was appointed Professor of Mathematical Physics in the same University. In 1851 he was made a member of the Philosophical College, an honour accorded to only twelve professors of the University of Rome. Besides his position at this University, Volpicelli also filled that of Professor of Mathematical Physics at the Roman Seminary, taught geometry to the pupils of St. Michael's Hospital, and founded at Rome the special School of Artillery, of which he was director for thirty years.

When Pope Pius IX. revived the celebrated and historical Lincei Academy in 1847, Volpicelli was appointed secretary, a post which he held for thirty years, when, as his health was failing, the academicians made him secre-

¹ Abstract of Lecture at the Royal Institution, Friday, February 28, 1879, by Sir William Thomson, LL.D., F.R.S.