

sound. No one, nevertheless, ever seems to have paid the smallest attention to his evolutionary theories. Even Silvestre, who pronounced his *éloge* at a public meeting of the Société Royale d'Agriculture in 1827, abstains from the slightest reference to them.

While in his experiments and his mode of drawing conclusions from them Duchesne strongly recalls the method of Mr. Darwin, the parallel cannot be carried further. In so far as he obtained a glimpse at the modern doctrine of evolution it was in the form afterwards formulated by Lamarck. Of the part played by the struggle for existence in the matter I find no trace in his writings.

W. T. THISELTON DYER

### TEACHING ANIMALS TO CONVERSE

MR. DARWIN'S notes on Instinct, recently published by my friend Mr. Romanes, have again called our attention to the interesting subject of instinct in animals.

Miss Martineau once remarked that, considering how long we have lived in close association with animals, it is astonishing how little we know about them, and especially about their mental condition. This applies with especial force to our domestic animals, and above all of course to dogs.

I believe that it arises very much from the fact that hitherto we have tried to teach animals rather than to learn from them,—to convey our ideas to them, rather than to devise any language, or code of signals, by means of which they might communicate theirs to us. No doubt the former process is interesting and instructive, but it does not carry us very far.

Under these circumstances it has occurred to me whether some such system as that followed with deaf-mutes, especially by Dr. Howe with Laura Bridgman, might not prove very instructive if adapted to the case of dogs.

Accordingly I prepared some pieces of stout cardboard, and printed on each in legible letters a word such as "Food," "Bone," "Out," &c. The head master of one of the deaf and dumb schools kindly agreed to assist me. We each began with a terrier puppy, but neither of us obtained any satisfactory results. My dog indeed was lost before I had had him long. I then began training a black poodle, "Van" by name, kindly given me by my friend Mr. Nickalls. I commenced by giving the dog food in a saucer, over which I laid the card on which was the word "Food," placing also by the side an empty saucer, covered by a plain card.

"Van" soon learnt to distinguish between the two, and the next stage was to teach him to bring me the card; this he now does, and hands it to me quite prettily, and I then give him a bone, or a little food, or take him out, according to the card brought. He still brings sometimes a plain card, in which case I point out his error, and he then takes it back and changes it. This however does not often happen. Yesterday morning, for instance, "Van" brought me the card with "Food" on it, nine times in succession, selecting it from among other plain cards, though I changed the relative position every time.

No one who sees him can doubt that he understands the act of bringing the card with the word "Food" on it as a request for something to eat, and that he distinguishes between it and a plain card. I also believe that he distinguishes for instance between the card with the word "Food" on it and the card with "Out" on it.

This then seems to open up a method, which may be carried much further, for it is obvious that the cards may be multiplied, and the dog thus enabled to communicate freely with us. I have as yet, I know, made only a very small beginning, and hope to carry the experiment much further, but my object in sending this communication is twofold. In the first place I trust that some of the

readers of NATURE may be able and willing to suggest extensions and improvements of the idea.

Secondly, my spare time is small and liable to many interruptions; animals also we know differ greatly from one another. Now many of your readers have favourite dogs, and I would express a hope that some of them may be disposed to study them in the manner indicated.

The observations, even though negative, would be interesting; but I confess I hope that some positive results might follow, which would enable us to obtain a more correct insight into the minds of animals than we have yet acquired.

JOHN LUBBOCK

High Elms, Down, Kent, December 20, 1883

### THE FRENCH DEEP-SEA EXPEDITION OF 1883

I HAVE just returned from a very short visit to Paris, made for the purpose of inspecting the Mollusca which were procured during last summer's deep-sea expedition in the French Government steamer *Talisman*. The expedition was under the scientific charge of Prof. Alphonse Milne-Edwards. For the opportunity of this inspection I was indebted to the kindness of my friend Dr. Paul Fischer, whose reputation as a conchologist is so well known.

The course of the expedition was along the Atlantic coasts of Spain, Morocco, Sahara, Senegal, Cape Verde Isles, the Canaries, and Azores; and the time occupied was three months. More full and accurate particulars will very shortly be given by Prof. A. Milne-Edwards to the Academy of Sciences, and be published in their *Comptes Rendus*. The collection will be exhibited next month to public view. The greatest depth explored was about 2200 fathoms. The trawl was mostly used. Life was plentiful everywhere. As was the case in the *Porcupine*, *Challenger*, and other expeditions of the same kind, many animals (especially Crustacea) at the greatest depths were highly and brightly coloured, some of them having large eyes, and others being blind or eyeless. There was an abundance of hitherto unknown forms (genera and species) in every department of zoology—fishes, Mollusca, Polyzoa, Crustacea, Annelids, Echinoderms, Polyps, Corals, Foraminifera, and Sponges. Among the Mollusca were some remarkable cases of the wide distribution of species in respect of space as well as of depth. For instance, boreal shells, such as *Fusus islandicus* and *F. berniciensis*, which inhabit northern seas at moderate depths, viz. 50 to 80 fathoms, were found living off the coast of Morocco, and the latter species even below the tropic of Capricorn, at depths of from 450 to 2200 fathoms. *Lima excavata*, considered a peculiarly Norwegian species, was likewise obtained off the Moorish coast, of a very large size; it was recorded by Prof. Seguenza as a Pliocene fossil of Sicily and Calabria, under the name of *Lima gigantea*. In the *Porcupine* Expedition of 1870 fragments were dredged off Cape St. Vincent; and in the *Challenger* Expedition this fine species was obtained from 10 to 175 fathoms off Western Patagonia and Japan. A bivalve (*Scrobicularia longicollis*), which in northern seas inhabits moderate depths, was procured in many places by the *Talisman*, at depths varying from 350 to 1429 fathoms. It occurred living in the deepest dredgings of the *Porcupine* Expedition of 1869, off the coast of Brittany, at a depth of 2435 fathoms. Many Mollusca (e.g. *Pecten vitreus*, *Limopsis minuta*, *Dentalium agile*, *Trochus oltoii*, *Columbella haliaeti*, and *Scaphander punctostriatus*) seem to inhabit the depths of the North Atlantic in every part, from one side to the other. The smaller shells in the *Talisman* collection have not yet been picked out. The Marquis de Folin will, with his usual care and industry, undertake that part of the work, which will occupy some time; he has requested me to examine and name those species which

are known to me. I understand that another deep-sea expedition will be made by our enterprising neighbours next summer, being the fourth in consecutive years.<sup>1</sup>

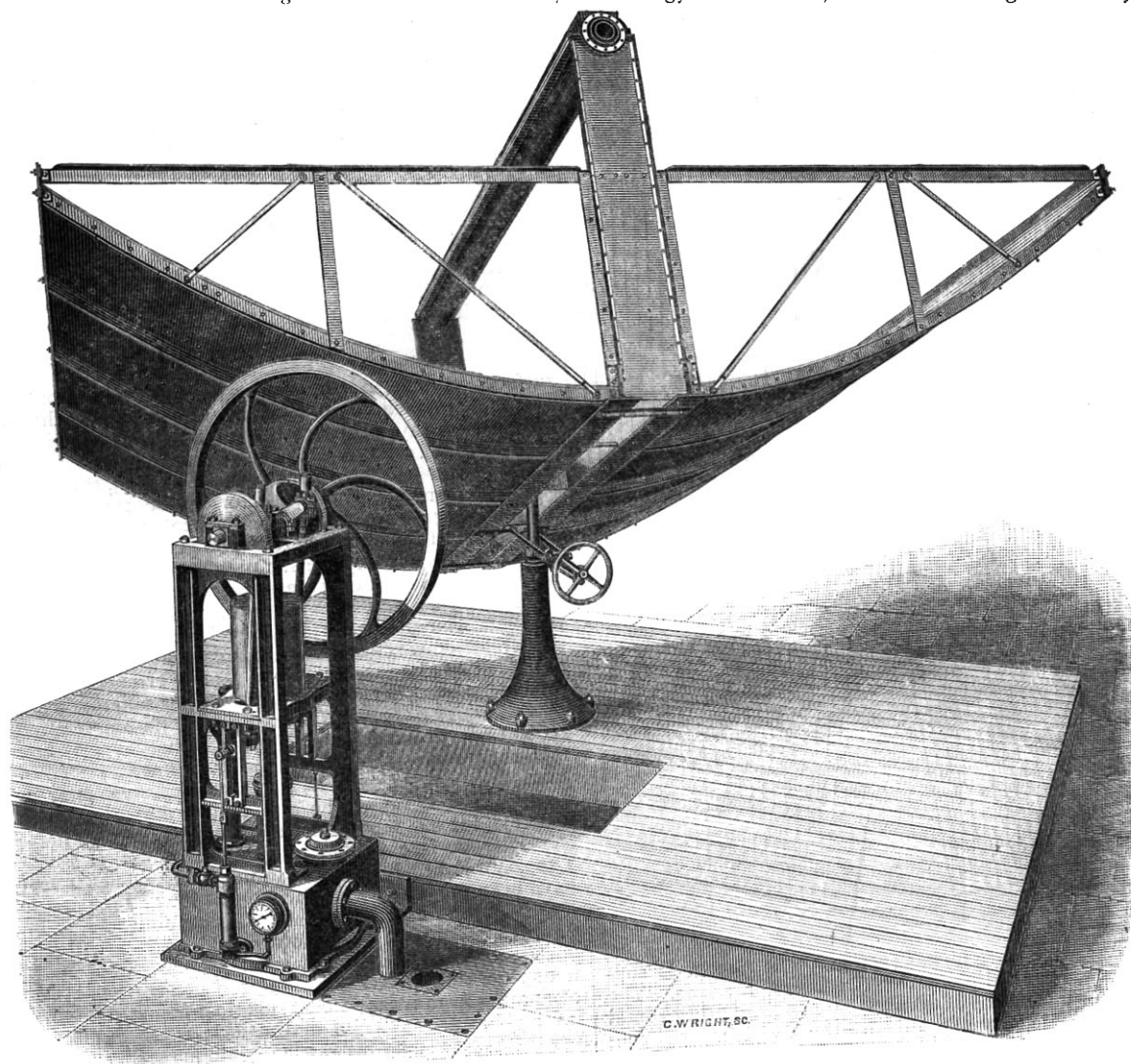
December 21, 1883

J. GWYN JEFFREYS

### THE SUN MOTOR AND THE SUN'S TEMPERATURE

THE annexed illustration (Fig. 1) represents a perspective view of a sun motor constructed by the writer, and put in operation last summer. This mechanical device for utilising the sun's radiant heat

is the result of experiments conducted during a series of twenty years; a succession of experimental machines of similar general design, but varying in detail, having been built during that period. The leading feature of the sun motor is that of concentrating the radiant heat by means of a rectangular trough having a curved bottom lined on the inside with polished plates so arranged that they reflect the sun's rays towards a cylindrical heater placed longitudinally above the trough. This heater, it is scarcely necessary to state, contains the acting medium, steam or air, employed to transfer the solar energy to the motor; the transfer being effected by



Ericsson's Sun Motor, erected at New York, 1883.

means of cylinders provided with pistons and valves resembling those of motive engines of the ordinary type. Practical engineers as well as scientists have demonstrated that solar energy cannot be rendered available for producing motive power, in consequence of the feebleness of solar radiation. The great cost of large reflectors and the difficulty of producing accurate curvature on a large scale, besides the great amount of labour called for in

preventing the polished surface from becoming tarnished, are objections which have been supposed to render direct solar energy practically useless for producing mechanical power.

The device under consideration overcomes the stated objections by very simple means, as will be seen by the following description:—The bottom of the rectangular trough consists of straight wooden staves, supported by iron ribs of parabolic curvature secured to the sides of the trough. On these staves the reflecting plates, consisting

<sup>1</sup> P.S.—In NATURE of December 20 (p. 172), I overlooked the misprint of India for Sweden.—J. G. J.