genera he would long ago have arrived at the same conclusions. It is certain that the soft parts of *Astrangia*, *Cladocora*, *Oculina*, and *Orbicella* are almost identical in all essential points of structure and form, as anyone may see by examining the published figures of the animals of these genera, though the living animals resemble one another much more closely than do the figures. Moreover there are species of *Astrangia* that bud laterally and grow up into branched forms not unlike *Oculina*, while the species of the latter are always encrusting while young, and have marginal buds, like the typical *Astrangia*, and some *Oculina* remain permanently nearly in this condition.

Nor do the internal structure of the corals afford any marked and constant characters for their separation. The Coenenchyma is often nearly wanting in *Oculinidae*, though usually characteristic, and it is sometimes present in *Astrangia*, even presenting the radiating surface lines so characteristic of *Oculina*. In fact it often requires very careful study to determine whether certain specimens belong to *Oculina* and *Astrangia*. Such are the genera that have "nothing in common." The relations between *Caryophyllia* and *Astrangia*, through *Paracynthus*, *Phylangia*, &c., are sufficiently obvious, and as I have fully discussed all these relations elsewhere (*Trans. Conn. Acad. I.* pp. 512 to 540, 1869), it is unnecessary to say more upon this point.

What Mr. Duncan means by saying that *Caryophyllia Smithii* was first discovered by the *Porcupine* Expedition in the European seas, is not evident, if he means the well-known species which has passed under that name in all English works, and which Dana illustrates by a figure copied from Gosse's "*Actinologia Britannica*" (which is the only figure that Mr. Duncan specially criticises). He also finds fault with Dana for saying that *Caryophyllia cyathus* is "widely distributed over the bottom of the Atlantic, even as far north as the British isles," and tells us that "those unrecognised workers have shown that it is not *Caryophyllia cyathus* but *C. clavus* which has the great horizontal range," referring of course to the "workers" who had described the corals of the *Porcupine* expedition. But in Mr. Duncan's paper on those corals (*Proc. Royal Soc.*, 1870, p. 289) he united both those species, together with *C. Smithii* and *C. borealis*, as mere varieties of one species, and makes a long argument to sustain that view, and concludes thus: "I have placed the species *borealis* in the first place, and regard the old species *C. clavus*, *C. Smithii*, and *C. cyathus* as varieties of it." Dana's statement was doubtless based on Mr. Duncan's assertions, in the paper quoted, that *C. cyathus* and *C. clavus* are identical, and the subsequent discovery of *C. clavus* in the Straits of Florida by Pourtales. The error, therefore, if such it be, belongs wholly to Mr. Duncan, and his remark that "had Dana waited a little longer he would have had the opportunity of quoting correctly," was, to say the least, quite uncalled for, and unbecoming to him. But the peculiar injustice of the critic is, perhaps, best seen in his studied omission of any credit to Dana for his extensive original observations and investigations upon the structure and formation of coral reefs and islands, and his intimations that the facts and theories are mostly borrowed. Thus he says, "The chapters on the structure of coral reefs and islands add little to the knowledge which Darwin and Jukes and Hochsteth have given us; but Dana's great powers of illustration enable him to reproduce the details with which we are so familiar—thanks to these authors—in very engaging forms." Dana has given Darwin full credit and well-merited praise, both in the preface and in many places in the body of the work, for his accurate observations of facts and discovery of the true mode of formation of coral islands; but he also states the well-known fact that his own observations had been made and his report written, in 1842, before the publication of Mr. Darwin's work. The report of Mr. Jukes was published still later (1847). Dana's observations were, therefore, wholly original, and relate mostly to regions not visited either by Darwin or Jukes. The chapters upon this subject are, as they purport to be, mainly a reprint of Dana's original report, with such additions from other and later sources as seemed necessary to make the work complete, all of which are credited to their original authors. In the preface the author says, "The observations forming the basis of the work were made in the course of the Wilkes Exploring Expedition around the world, during the four years from 1838 to 1842." Had Mr. Duncan taken the trouble to examine the original report, he would have found there the true source of most of the facts narrated. The figures of corals were also mostly copied from those in the atlas of his report on zoophytes, which were originally drawn by Dana himself from Nature, so that it is not

strange that "some of them are very correct representations of Nature." When the figures are not original, their source has invariably been given. The charge that Dana does not give due credit to others is simply ridiculous, and in no case more so than when he is accused of treating the works of Edwards and Haime with "supreme contempt, inasmuch as he rarely gives them credit for their good work," for in the list (p. 379) of the species of corals described in his great work on Zoophytes, prepared at his urgent request by the writer, he has adopted, without hesitation, all the numerous rectifications made by them, as well as those made by the writer and others. A considerable number of corrections also appear in that list for the first time, and it must, therefore, be quoted as the original authority for such changes. Nothing less than the complete absence of personal vanity and pride, and entire devotion to the advancement of scientific truth, for which Prof. Dana is so justly distinguished, could have induced him to have published such a list in this book. No doubt instances may have occurred in which he has unintentionally overlooked writings of more or less importance. If so, he will doubtless make amends in the next edition. The authority for well-known facts is not always given, because such references would uselessly encumber the book. In other cases, where to mention would be only to condemn, such references have been intentionally omitted when they would have served no useful purpose. Such was the case in respect to the various erroneous European classifications, which were not adopted. Such was also the case when, in describing the extensive coral reefs of Brazil, so well explored by Prof. Hartt, and which were shown by the writer to consist of corals related to and partly identical with those of the West Indies, he does not refer to Mr. Duncan's assertion (*Quar. Jour. Geol. Soc.* xxiv. p. 30) that "the Orinoco drains a vast tertiary region, and shuts in the coral-life of the Caribbean on the south," and that "the Florida reefs consist of few species," when more than forty-five species had even then been recorded from them, or more than he admits for any existing reefs. Other statements and theories concerning the recent and fossil corals of the West Indies, in the same paper, have become equally absurd, in consequence of the recent discoveries of Pourtales, and needed no exposure. His assertion that the isthmus of Panama was deeply submerged during the Miocene, and again forcibly urged in his criticism of Dana, may rest on no better foundation than the other assertions just quoted from the same paper, notwithstanding the careless way in which he misquotes, as to place of publication, and misrepresents, as to the contents, a brief article in opposition to that view by the writer. We still look in vain for such proofs as would be afforded by elevated coral reefs having relations to those of the West Indies, but situated on the Pacific side, or even upon the higher parts of the isthmus. The well-known existence of elevated coral reefs in the East Indies and Polynesia, and their presence in the West Indies, known long before Mr. Duncan began to write his valuable papers, proves nothing of the sort. Whatever relations do exist between the fossil corals of the East and West Indies can be easily explained in other ways. We think it singular that while certain geologists find it necessary to force the Gulf-stream across the isthmus during the warm Miocene, others find it quite as important to turn it out of the Atlantic, across the isthmus, during the glacial period. Both assumptions seem equally gratuitous, and may be opposed by numerous facts.

A. E. VERRILL

Animal Instincts

ALLOW me to add two or three facts to the interesting store supplied by your correspondents.

Some years ago a dog was sent to me at Taunton from Honiton, distant seventeen miles. It was conveyed in a closed hamper and in a covered cart. It escaped from my stable on the evening of its arrival, and at 11 o'clock on the following morning it was at its home again. The route lay over a ridge of steep hills.

Mr. Robert Fox, of Falmouth, so well known to the scientific world, is my authority for the following:—The fishermen of Falmouth catch their crabs off the Lizard rocks, and they are brought into the harbour at Falmouth alive and impounded in a box for sale, and the shells are branded with marks by which every man knows his own fish. The place where the box is sunk is four miles from the entrance to the harbour, and that is above seven miles from the place where they are caught. One of these boxes was broken; the branded crabs escaped, and two or three days afterwards they were again caught by the fishermen at the

Lizard rocks. They had been carried to Falmouth in a boat. To regain their home they had first to find their way to the mouth of the harbour, and when there, how did they know whether to steer to the right or to the left, and to travel seven miles to their native rocks?

Another, of which the drover is my informant. Large flocks of sheep are driven weekly from the Welsh hills to the London market. Some time since two escaped in the dark and were supposed to have been stolen. About a fortnight afterwards the two stray sheep reappeared on the Welsh mountains, whence they had been brought. They had found their way through a journey of at least 100 miles. My informant learned from some of the turnpike-gate keepers on the road that, when opening the gate at night to a traveller, two sheep had been seen to rush through.

The nightingale returns from Greece, not merely to the same country, but to the same field and the self-same bush. The swallow takes possession of the same nest.

EDWARD W. COX, Serjeant-at-law

Carlton Club, March 31

The Sociability of Cats

IT may prove of interest to naturalists to record the following curious instance of the social habits of cats:—

I once had two she cats that were upon very intimate terms with each other, always together, and never appeared to have quarrelled. At one time, one of them being about to add an increase to their number, the other very kindly nursed it, and even performed the function of a midwife, and actually attended to the necessary offices that are in ordinary cases attended to by the parent of the progeny. Feeling some interest in curiosities of natural history, I carefully watched my pets, and can therefore vouch for the truthfulness of this extraordinary manifestation of feline sociability.

I may here mention that, as regards the teachableness of cats, I once saw at the house of an intimate friend a fine, large tabby tom-cat put through a drill which would perhaps outvie similar exhibitions of the genus *homo*. He was told to "stand up," "shoulder arms," "present arms," and "stand at ease," which, by observing the hands of the master, he would most obediently do, and with a promptness that was astounding. Another cat was told "to beg," which it at once did by jumping on to a Windsor chair, and performed some curious twistings and rollings that were continued until the morsel of meat was awarded. I have recently introduced a fine kitten to the company of two cats I have had for years. For a long time a deadly feeling of enmity was maintained against the stranger; but now, after a period of three months, the two older cats will not lap their morning's milk until the kitten is in their company; if absent, they actually retire, and refuse to take their meal.

Red Lion Street, March 26

J. JEREMIAH

Manitoba Observatory

HAVING seen in vol. vii. p. 289 of NATURE a statement to the effect that the American Government had established an observatory at Fort Garry, Manitoba, I have to inform you that the so-called observatory is a telegraph reporting station maintained by the Dominion of Canada. Its tri-daily reports, however, in common with those from several other Canadian telegraph stations in correspondence with Toronto, are always placed at the disposal of the Washington weather office.

G. T. KINGSTON

Magnetic Observatory, Toronto, Canada, March 11

ST. THOMAS CHARTERHOUSE TEACHERS' SCIENCE CLASSES

PRIOR to the introduction of Mr. Lowe's revised code, elementary science teaching was always to be found in the curriculum of our best primary schools. The properties of water, the constituents of some of the chemical elements, the first principles of mechanics and the like, were taught with much pleasure by the masters of the schools above alluded to. "Payment by results" on the three R's threw cold water upon this class of intellectual teaching, and it has only been revived recently through agitation emanating from enlightened educators. Teachers of late years too have had their studies very much limited by the low requirements of the Education

department, and hence many young teachers were launched out into the teacher's profession unable themselves to impart instruction formerly given in our schools. Teachers have long been clamorous for having the standard of education raised in their schools, and have therefore hailed with great satisfaction the act of the Science and Art Department whereby additional grants are given to any pupils or adults or juveniles who could, after receiving a certain number of lessons from a qualified teacher, pass an examination on the subject-matter of these lectures. Teachers, however, before they are permitted to give these lectures to pupils, are required to pass an advanced examination on the subjects they propose to teach. To enable teachers to pass these tests, the St. Thomas Charterhouse Teachers' Classes were inaugurated in October last. The idea was organised by Mr. C. Smith, one of the teachers and organising secretaries, and was carried out under the auspices of the Rev. J. Rodgers, M.A. To the credit of our primary teachers it ought to be added that they have since the promulgation of the idea worked most heartily to bring it to this desired consummation. Prof's. Huxley, Ansted, Carruthers, Sir John Bennett, and several other scientific men joined the committee for carrying out the classes. From every part of London masters and mistresses of our elementary schools gladly joined the Science School. Over 230 teachers were initiated, and it is hoped that most of the teachers will qualify themselves in the coming May examination to be able to teach the science subjects they have studied in these classes. Thus from this nucleus it is thought that next year we shall have science classes in connection with nearly every school (elementary) in the metropolis; and undoubtedly in a year or two more the inculcation of elementary general science knowledge will be almost universal.

Science teaching in the hands of a skilful instructor is always popular with young people, and as elementary teachers are eminently successful as collective teachers of the young, who could be better entrusted with imparting instruction which so brightens the intellect as these educators? The chief subjects taken this year at this science school are chemistry, mathematics, acoustics, light and heat, magnetism and electricity, botany (systematic and economic), geology, physiology, plane and solid geometry; but next year the promoters of the scheme hope to have classes in all the twenty-five subjects recognised by the Science Department of the Government. Most of the present students of the classes go in vigorously for physiology, physical geography, and acoustics, light and heat, a great many for chemistry. The teacher of chemistry, Mr. Spratling, has got up a first-rate laboratory for chemical experiments. Mr. Payne, teacher of magnetism and electricity, has all the approved auxiliaries for performing experiments connected with this subject. Next year the biology students will have every facility afforded them for microscopical practice. Mr. Simpson, who has done at least as much as any other person in London to train science teachers, is engaged as the special lecturer on Biology.

During the present session several of our leading scientific men have given a professional lecture to stimulate the teachers in their studies. Dr. Gladstone, Dr. Jarvis, Prof. Ansted, Prof. Carruthers, Mr. Tylor, Rev. W. Panckridge, Prof. Skerthley amongst the number. All the ordinary lectures are given by elementary teachers who have qualified themselves to teach. Two of the students, Mr. Bird and Mr. Powell, who have spent some of their leisure moments in making observations in botanical science, render much valuable aid to their fellow students in furnishing examples to illustrate the lessons given in botany. The students generally are pursuing their studies with great avidity, and as was observed at the Devon Social Society Gathering, by Mr. C. Clarke the importance of these classes cannot be over-estimated.