

There are two other methods of transfer of molecular motion to which brief allusion may be made. One of these is the electric transfer. The character of this we do not know, but we have reason to believe that it is vibratory, and that it bears certain analogies to light vibration. The other method is heat conduction. This is a transfer of energy by exchange of normal vibrations. It takes the place in solids of the impact transfer in gases. The molecule of the solid, when possessed of excess motive energy, cannot yield it to others by impact, and must therefore do so by a drag upon these others through the ties of attraction. This is the slowest of all modes of transfer of energy. For its proper action it is necessary that the substance should be homogeneous, and the vibrations of its molecules normal. The instant the tension changes, either by connection of unlike substances or a condensing twist in a homogeneous substance, the mode of transfer changes. The heat vibration of the molecule is offered to another of different pitch, which refuses to receive it as normal vibration, and at once the rapid electric transfer manifests itself. Normal heat vibration is thus converted into thermolectricity.

Their brief review may help to give some idea of the relations between molecules. In their state of normal equilibrium, which they seek to regain after every excursion, they possess no independence of movement, but are rigidly confined within fixed limits. They may change place in common with all the molecules of the mass to which they belong, but not independently. Vigorous disturbing influences may break up the molecular grouping, but immediately a new stable grouping is assumed. The incessant molecular disturbances which occur do not usually cause a change of grouping. These consist of vibratory transmissions of energy, and of transfers of motion through impact of molecules, and their effect is but the production of momentary variations in the direction and vigour of the motion of the affected molecule. To the influences of this character above mentioned may be added those of the vibrations of sound, of magnetic energy, and of chemical affinity. The latter alone produces any marked variations of molecular grouping.

Philadelphia, U.S.

CHARLES MORRIS

On the Morphology of the Pitcher of "*Cephalotus follicularis*"

I OBSERVE that the last sentence but one of my brief notice of *Cephalotus*, which appeared in NATURE last week, is calculated to convey an erroneous impression. The lid *g* of Fig. 1 is seen to be a conical structure with a relatively broad base and a narrower indented apex. In the matured pitcher the free portion of the lid is much broader than its more contracted base; and the developed and involuted margin referred to extends round the mouth of the pitcher *until it reaches that base, but does not cross it*, as by an oversight on my part my words imply.

Fallowfield, Manchester, June 8 W. C. WILLIAMSON

A Large Meteor

THE meteor seen by Mr. Hall of Shoreham (NATURE, vol. xxviii, p. 126) was also observed by Mr. James Cullen of the Stonyhurst Observatory. Its path, as seen from here, was from S.E. by E. to N.E. by E. (true), traversing an arc of about 70°. Its altitude was not more than from 12° to 15° above the horizon. It travelled exceedingly slowly, was visible for about 20 seconds, and was first seen at 10.30 p.m. G.M.T. Its size was that of the full moon, white in colour, and with a tail 10° to 12° in length. It burst into a shower of small pieces before it disappeared, presenting exactly the appearance described by your correspondent.

Owing to the twilight and to the haze which hung about the horizon, its position could not be referred to the stars, the only star visible being α Aquilæ, near which the meteor passed. From the compass bearings and altitude given above its approximate path was from $\text{AR } 18\text{h. } 50\text{m. } \delta - 2^\circ$, to $\text{AR } 22\text{h. } 35\text{m. } \delta + 25^\circ$.
Stonyhurst Observatory S. J. PERRY

YOUR correspondent, A. Hall, in your issue of June 7, records the appearance of a large meteor seen by him at Shoreham, Kent, on Sunday evening, June 3, at 10.40. I recorded the same meteor in the *Newcastle Daily Journal* as follows:—

"An Enormous Meteor.—Mr. Barkas informs us that on Sunday evening, June 3, at 10.40, an enormous meteor of great brilliancy moved slowly across the heavens from south to north,

at an elevation of 30 degrees, and nearly horizontally. The colour was bright white, the apparent length 5 degrees; it had the form of an artist's brush; and the handle broke into many fragments. The head suddenly disappeared. This meteor was seen at Newcastle, Wreckington, and Cullercoats, and it would be interesting to know in what position it was observed at points far south of Northumberland."

Your correspondent does not say whether he saw it towards the south or north, nor does he state its elevation above the horizon. It would be interesting to know its apparent elevation at places north of Kent and south of Northumberland.

Newcastle-on-Tyne, June 8

T. P. BARKAS

Intelligence in Animals

IN NATURE (vol. xxviii, p. 82) is a letter headed "Intelligence in a Dog," which certainly shows that a power of reflection is sometimes possessed by the canine species far beyond what one ordinarily observes in them. Perhaps the following anecdote will interest some of your readers, in which it will be seen that the common crow of India exhibits (occasionally at least) an equal amount of a quality superior to what is usually styled *instinct* in animals.

In the summer of 1878, when I and a friend were travelling in the Himalayas, we marched from Dharmasala to Simla, passing through the native states of Mundi, Suket, Bilaspur, and Erki. One day, when we were about half way between Suket and Bilaspur, we rested two or three hours under the shadow of a rock whence there issued a spring of water most welcome to us thirsty and somewhat weary travellers. We drank our fill and threw ourselves down upon the ground. After we had been there a short time an old crow and its half-grown young one came also to slake their thirst. I happened to have a small piece of a stale chuppati (or unleavened bread which the natives eat) in my pocket, and I threw it to them; the old bird examined it, turned it over, and then called her young one to come and partake of it. The latter did his best to obey his parent, but the morsel was so hard and dry he could not manage to eat it, and said so in his own bird language. The old bird then as plainly replied "try again," which he did most obediently, but with no better success. The old bird then took up the rejected piece and deliberately placed it in one of the little streams formed by the water of the spring (perhaps about six feet beneath where I was lying); she then hopped off, followed by her young one, and here comes the most curious part of the story: in about a quarter of an hour or so both birds returned to this spot, the old one with her beak pointed to the piece of chuppati, which by that time had been rendered soft by the action of the water, and by signs and sounds seemed plainly to tell her young one, "There now, the food is soft; eat it, and no more nonsense." This the young bird immediately did.

Copenhagen, June 8

COSMOPOLITAN

MY big black Newfoundland retriever, "Faust," has a chivalrous habit of taking smaller and weaker dogs under his protection, and about two years ago he constituted himself champion of a wretched little thoroughbred mongrel whom we called the "Pauper," because it lived on charity in the garden opposite our house. "Faust" goes out marketing with the housekeeper, and as he has a passion for bread the baker's children always give him a stale roll. One day, for fun, they gave him two, which he picked up with some difficulty and then left the shop, followed by some of the children, one a lad of sixteen. "Faust" walked along the side of the garden railing till he met his pauper friend, to whom he gave one roll, and then ate the other himself, waving his tail vigorously in evident satisfaction. A neighbour of ours has a kitchen cat who was taken in out of charity himself, and who has several times brought in famishing friends for a meal.

NELLIE MACLAGAN

Edinburgh, June 11

EASTERN ASIA AT THE FISHERIES EXHIBITION

THE sections of the Fisheries Exhibition devoted to China, Japan, and the British settlements and protected native states in the Malay Peninsula, are in some respects disappointing. The interest and beauty of the Chinese section are indeed unsurpassed; but the other

sections fall far below what might have been anticipated. At the Fisheries Exhibition in Berlin three years ago, Japan was excellently represented; and when we recollect that fish forms one of the principal—probably next to rice and millet, *the* principal—staples of Japanese food, that the fishing-grounds extend from the most northern Kuriles almost within the Arctic circle, through various zones down to the most southern islands of the Loochoo archipelago, where they approach the sub-tropical regions, and that the primitive methods of catching and preserving fish of more than one race are now daily practised in various parts of this chain of islands, known as the Japanese Empire, it will be seen what scope the Japanese authorities had to make their section of much practical and scientific interest. At Berlin their section did possess such interest, and the collection formed for exhibition there has, we believe, been made the nucleus for a domestic and permanent Fisheries Exhibition in Tokio. Failing the time or funds necessary to make a representative collection for London this year, it was open to the Japanese Government to take a single portion of their vast fishing-grounds—such as Yezo, or the Inland Sea, or the Loochoo Archipelago—and represent that only. This has been done by China with marked success. As it is, Japan is represented in the small space allotted to her by specimens of the fish tinned at the Government canning establishments at Sapporo in Yezo, and by a stall full of pictures on silk, lacquer, &c., of fish and fishing. These latter are all marked, "For sale at the close of the Exhibition." Doubtless the Japanese authorities had good reasons of their own for thus limiting their participation in the present Exhibition; still it is permissible to express regret that they did not add, as they undoubtedly could have done, more to its value and interest.

In the Malay States and the Straits Settlements fish is not such a staple of food as in Japan, and they are on the whole fairly represented. The curious Malay method of catching fish by constructing long and labyrinthine bamboo and cane fences, wide at the beginning and narrowing towards the end, where the fisherman's hut is placed aloft, is represented by two or three models. These long fences, sometimes stretching far out to sea, are familiar objects to every traveller in the Straits. They are protected by stringent local ordinances, and woe betide the unskilful shipmaster who runs his vessel through them.

The Chinese section, viewed from a popular standpoint, is certainly a success. No pains appear to have been spared to make it representative of the Celestial Empire in its decoration. The Chinese ambassador himself has contributed two scrolls in large characters containing verses of poetry. To the staff of the Imperial Customs under Sir Robert Hart—foremost in all that is for the welfare and good name of China—belongs the credit of this section. It would of course be impossible to represent in a single foreign contribution the fisheries of China, extending over more than 2000 miles of coast line, as well as many thousands of miles of rivers and canals, and accordingly it was decided to represent thoroughly one portion of the coast. At Berlin the Ningpo fisheries were so represented, and for this year, Swatow, a treaty port on a large estuary a little to the north of Canton, was selected. The nets, boats, lines, traps, and other implements used in fishing here, the dresses of the fishermen at various seasons, models of their huts, and a scientific classification of the fish caught in this district, form the bulk of the Chinese exhibits. In addition to Swatow, an attempt has been made also to represent Ichang, a port on the Yang-tsze, situated about 1000 miles from the sea, as well as the fisheries of South Formosa and the neighbouring islands. The collections were evidently made and catalogued in China and arranged here by experienced hands. The special catalogue published by the order of Sir Robert Hart forms a

complete descriptive guide to the whole, and is most interesting and instructive. Speaking generally, it may be said that the observer is most struck in this section with the extraordinary ingenuity displayed in utilising the most ordinary and unpromising objects for the purpose of fishing. Thus in Swatow they employ a boat drawing a few inches of water, with the rail nearly level with the surface. A narrow plank fixed along one side is painted white, and the light of the moon falling on it causes the fish to mistake it for water. They jump over the plank into the boat, where they get entangled in moss or grass. At Ichang, a wild animal such as the otter is trained, not to catch fish, but to frighten them into the net; while at Ningpo, cormorants are regularly and systematically trained to fish. These and many other devices shown at the Exhibition mark the Chinese as the most ingenious and accomplished fishermen in the world. A large collection of corals, of crustaceans, mollusks, and other fish will attract the scientific observer, who will be much assisted in his examination by the special catalogue before mentioned.

NOTE ON THE INFLUENCE OF HIGH TEMPERATURE ON THE ELECTRICAL RESISTANCE OF THE HUMAN BODY

THE experiments which I have now for some years been carrying out as to the various forms of medical electricity have begun to furnish trustworthy results. Some of these, with the help of De Kilner, were incorporated in a paper read before the Society of Telegraph Engineers on March 9, 1882. We there stated that at present "we are hardly in a position to say how far the resistance of the body varies in health; but in disease it can be fairly stated that it sometimes diminishes and sometimes augments." Of this fact we gave illustrations.

It had often occurred to me that the temperature of the human body very probably influences its resistance; and some experiments had been made with a view of testing the amount of such influence. But in pathological researches it is often difficult to find a case not open to exception, and it is frequently necessary to wait a considerable time before, in the impossibility of experiment, accident presents one possessing the necessary conditions. Such a case I have now met with, and it is worth while to place it on record, if only to enable other observers to prosecute this line of investigation.

The patient is a young and intelligent gunsmith aged twenty-two. He had rheumatic fever severely twelve years ago, which, as is usual in young subjects, has left permanent heart disease behind it. This did not, however, prevent his following his trade until the beginning of April in the present year. He then began to suffer from morning rigors, occurring at first at the interval of from seven to ten days, but, since Easter, daily. He came into my ward in St. Thomas's Hospital on April 28. It is not necessary to detail the medical history of the case in a scientific periodical; it will be sufficient to state that about 8.30 a.m. he was in the habit of suffering from severe attacks not unlike those of ague, in the course of which the temperature rapidly rose to 105° F. In the afternoon it sank to the normal human temperature of 98° or 99° F. The cause of this remarkable symptom is still somewhat obscure; it has completely resisted the action of quinine and other antiperiodics, as well as salicylic acid, aconite, and other approved lowerers of temperature. It is probably due to ulcerative endocarditis slowly advancing. The most remarkable part of the case is that it causes the patient no suffering or inconvenience whatever. His mind is clear, and, except the feeling of chilliness during the period of heat, he makes no complaint. He is able to take interest in the determinations which I proceed to give.

It occurred to me that this unusual range of daily tem-