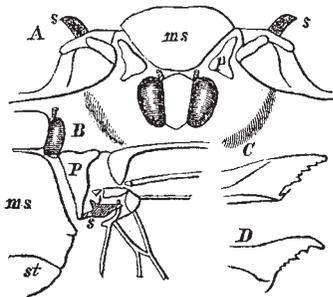


moth worked its way at once out of the slit. The wings at this time being very small and flabby, and the shoulders being alternately much raised, the points stuck up far enough to cut or saw through the cocoon. The wings were at first of a deep buff yellow, but in half an hour after they began to expand and to turn green. The black points can be detected when the wings are fully expanded, not being entirely covered by the hairs at the base of the wing. In this case no fluid was seen to exude from the mouth, and the cocoon was perfectly dry. The black points are seen, when magnified, to have the form of a rude saw, and Dr. Packard proposes for them the term *sectores coconis*. The cocoon-cutters were found in every other species of the sub-family *Attaci* that was examined; in *Telea polyphemus* they are large and well-developed; they are rather small in *Callosamia promethea*, *Platysamia cecropia*, *P. Gloverii*, *Samia cynthia*, an *Attacus* from Nicaragua, and *Attacus amazonia*, Pack., from Pebas,



Peru; large and well-marked in the European *Saturnia pavonia-minor* and *Endromis versicolora*. In *Bombyx mori* the spines are not well-marked, and they are quite different from those of the *Attaci*. They are three sharp points, being acute angles of the pieces at the base of the wing. No such spines are present in *Eacles imperialis*.

In the accompanying cut A represents a front view of a specimen of *Actias luna* which came out of the cocoon and died with the wings not expanded; the shoulders are elevated, and the rudimentary wings hanging down; *ms* the scutum, *s* the cocoon-cutter, *p* the patagium. B represents another specimen with fully-developed wings; *ms* the scutum, *st* the scabellum of the meso-thoracic segment, *s* the cocoon-cutter, which is evidently a modification of one of the pieces at the base of the fore-wings; it is surrounded by membrane, allowing free movement. C and D are modifications of the spine or *sector coconis* considerably magnified, showing the five or six irregular teeth on the cutting edge, the spine being sharp, curved, and conical. It will be seen that it acts like a rude saw.

FEAR OF SNAKES IN PRIMATES.—MR. A. E. BROWN has recently made experiments in the Philadelphia Zoological Garden, in pursuance of those of Mr. Darwin. He coiled a *dead* snake in a newspaper, so as to be easily capable of coming loose, and set it on the floor of a cage containing a great variety of monkeys. It was instantly carried off by a leading spirit, but in a few seconds the paper became unfolded and the snake was exposed. The monkey instantly dropped it and went away, but with a constant look behind. The other monkeys, perceiving the snake, approached, step by step, and formed a circle round it six or eight feet in diameter. None approached except one Macaque, who cautiously made some snatches at the paper. At this moment a string which had been attached to the snake's tail was gently pulled; the snake moved, consequently, and the monkeys fled precipitately, with great chattering and screaming. Some time after they gradually returned to their former position, and they continued for some hours showing both intolerable fear and a strange attraction. The same monkeys had no fear of a tortoise or a small

dead alligator. The same snake was then shown to mammals of other orders, but none of them showed any especial interest. It is seen that the same dread of snakes is shared by the human species, especially women. Mr. Brown was able to trace, in the actions of a woman who was deaf and dumb, very similar fear, attraction, and repulsion to that shown by the monkeys. Is this a relic of early struggles for existence with an enemy whose bite produced results very different from that of other animals, and exposed mankind to a death lingering and horrible?

THE FERTILISATION OF EGGS OF THE LAMPREY.—We have frequently referred to the great progress of researches into the actual phenomena of fertilisation, especially those of Hertwig. Ernst Calberla, of Freiburg, is another most earnest pursuer of this subject, and he has followed the fertilisation of the lamprey. His views corroborate very strongly those of Hertwig, with some additional particulars. He finds a very distinct external micropyle, with a channel in the yolk leading into the ovinucleus (*Eikern*), which is the residuum of the germinal vesicle. The spermatozoon which is so fortunate as to find the micropyle, enters it and gives rise to the sperm-nucleus (*Spermakern*), which appears twenty-six seconds after the entrance of the spermatozoon into the micropyle. In a minute and a half altogether, the cleavage-nucleus (*Furchungskern*) is seen. After five hours the first cleavage furrow arises, at the spot where the micropyle was situated. In the *Zeitschrift für wissenschaftliche Zoologie*, vol. xxx. part 3, Calberla gives a most interesting account of his procedure and observations, and reviews the work of other investigators, giving a capital bibliography which is of value to those interested in such a rapidly expanding subject.

GEOGRAPHICAL NOTES

ADMIRAL SIR GEORGE BACK, F.R.S., died on Sunday at the age of eighty-one years. He entered the Royal Navy when twelve years old as a midshipman on board the *Arethusa*, and in 1818 joined a vessel under the command of Sir John Franklin, whom he accompanied on his expedition overland from Hudson's Bay to the Coppermine River, having already taken part under Capt. Buchan in his perilous voyage of discovery made to the neighbourhood of Spitzbergen. In the spring of 1825 Lieut. Back again accompanied Sir John Franklin on his second expedition to the Arctic regions for the purpose of co-operating with Capt. Beechy and Capt. Parry in their simultaneous efforts to ascertain from opposite quarters the existence of a north-west passage. Full details of this voyage will be found in Franklin's "Narrative of a Second Expedition to the Shores of the Polar Sea." Back was again appointed in the spring of 1833 to conduct the expedition fitted out for the purpose of seeking and relieving Sir John Ross, who had gone out nearly four years previously in quest of the north-west passage. A full account of the results of that hazardous enterprise, in the course of which he discovered the river which has since borne his name, Capt. Back gave to the world in his "Narrative of the Arctic Land Expedition to the Mouth of the Great Fish River and along the Shores of the Arctic Ocean in 1833-35." In 1836 Capt. Back sailed in command of another expedition to the frigid zone. The details of this expedition, in the course of which he reached Frozen Strait, almost within sight of Repulse Bay, were published by Capt. Back in his "Narrative of the Expedition in Her Majesty's Ship *Terror*, Undertaken with a view to Geographical Discovery, in 1836-37." In 1857 he obtained flag rank, but had not been afloat since that date. In 1837 Back had awarded to him the gold and silver medals of the Geographical Society. He also was honoured by the gold

medal of the Geographical Society of Paris, of which he was made a corresponding member. He was knighted in 1839, and elected a Fellow of the Royal Society in 1847.

In the latter part of January and in February last Mr. G. J. Morrison, of Shanghai, made an interesting journey overland from Hankow to Canton. The distance in a straight line is about 525 miles, and he estimates that an ordinary route would be less than 700 miles, though by the route he took it was 860 miles. On the whole, Mr. Morrison does not appear to have experienced any very grave difficulty with the natives during his journey; the people in the southern part of the province of Hupei were very civil, and not very inquisitive; but as he got into Hunan, the population of which is notoriously turbulent, he remarked a great difference. The main portion of his land journey was through a district which had not been visited by a foreigner "within the memory of the oldest inhabitant," and the natives—as is always the case in out-of-the-way parts of China—were most anxious to see the stranger. Mr. Morrison's great trouble appears to have been with his maps, and this was especially the case where the provinces of Hunan and Kwangtung meet. "The Chinese maps of this district," he says, "are very incorrect, and some foreign maps are worse. The fact that along the north of Kwangtung there is a range of mountains, but that this range does not form the watershed, has been puzzling to geographers. Ichang, which is on the south side of the pass, is still in Hunan, and is situated on the head waters of an affluent of the North River of Kwangtung. This affluent runs in a narrow gorge through the range above referred to." The country through which Mr. Morrison passed on his journey presented many points of interest. Near Wuchang, on the right bank of the Yang-tsze, the land is low and subject to floods, but a short distance to the south it becomes undulating. A little to the west of Puki, on the borders of the great tea-districts, as elsewhere in Hunan, a large quantity of tea-oil is made; the plants from which the seeds are obtained grow about eight or nine feet high, and are more straggling than the tea-shrub. The Siang River, which flows through Hunan, Mr. Morrison found to be in some places nearly a mile broad; but its usual width, when the water is low, is about one-third of a mile. At certain seasons vessels of considerable size are able to ascend as far as Changsha, the capital of the province of Hunan, which is a large and apparently prosperous place. Siangtan, a great trading-place further on, though only a third-class city, is larger than Changsha, and its population is estimated by the Chinese at one million, which, no doubt, is an exaggeration. In the neighbourhood of the borders of Kwangtung the country is bleak and uninteresting. The road over the Che Ling Pass, which is by no means steep, is crowded with traffic, tea-oil, tobacco, &c., going south, and salt and Canton goods going north. The absence of trees is very noticeable both in Hunan and Kwangtung; in the latter the traveller sees the hills for miles denuded of every tree, but in Hunan some attempts are being made at replanting. The part of Mr. Morrison's journey which interested and astonished him most, was the examination of the coal-fields of Hunan and Kwangtung; but it was with very great difficulty that he obtained permission to visit one mine. He noticed that there, as in all Chinese mines, the great want was a good road, which seriously interferes with the output of coal.

AMID all the disasters from flood and drought which have fallen upon China of late, the *North China Herald* says it is pleasant to learn that the great river which has earned the epithet of "China's Sorrow," has not this year justified its name. The Governor-General of the Yellow River reports that the unprecedented cold of the winter caused the upper waters to freeze, and that for

more than a month all traffic was suspended, letters having to be forwarded overland by circuitous routes, a necessity which has not arisen for many years, while the pressure of ice in the upper waters caused a rise of one or two feet lower down.

WE have already referred to the fact that relics of the Franklin Expedition have been heard of as in possession of the Nechelli Eskimo away to the west of Hudson Bay. The schooner *Eothen* has left New York under Capt. T. F. Barry—who was in communication with these Eskimo last year—with a party to search for and bring back the relics—among which are said to be written records. The *Eothen* goes to Repulse Bay, whence a party will sledge west about 600 miles to a point near Cape Englefield, where the relics are said to be. The expedition is expected to be away two years and a half.

WE have before us a number of German geographical journals, the nature of whose contents we can only briefly refer to. Indeed the number of these journals in Germany, and the high quality and variety of their contents, are remarkable; they forcibly illustrate the often-repeated saying that geography has become the meeting-place of all the sciences. First, we have advanced sheets of the July number of Petermann's ever-welcome *Mittheilungen*. The first article is by Dr. van Bebber, on the distribution of rain in Germany during the four quarters of the year, and is illustrated by four maps. A remarkably picturesque preliminary, but lengthy, account of his travels in the Caucasus in 1876, is contributed by Dr. Gustav Radde, whose observations on the botany of the region are valuable. Dr. Wojeikoff has an important article on the results of the recent Siberian Surveying Expedition, and Dr. Brehm contributes his usual admirable monthly summary. From the Berlin Geographical Society we have Nos. 3 and 4 of the *Verhandlungen* and Nos. 74 and 75 of the *Zeitschrift*. In the former the principal paper is an account of Thielmann's recent ascent of Cotopaxi, and a long and learned paper by Baron von Richthofen on Prjwalsky's recent journey to Lob-nor. In the *Zeitschrift* (No. 74) is a paper (with map) on the distribution of rain in Europe, by Dr. Otto Krümmel, and a paper of great interest, also with a map, by Dr. Theobald Fischer, on the changes in level of the Mediterranean Coast; the map shows at a glance what parts of the coast are rising and what parts are sinking. No. 75, *à propos* of the recent jubilee of the Society, has a long and interesting account of the progress of geography during the past fifty years, especially in connection with the work done by the Society. This is followed by a paper, with map, on the ethnography of Epirus, by Dr. Kiepert. In the *Mittheilungen* of the Vienna Society the two principal papers also relate to the East; one (a continuation) being on the Turkish Vilayet of the Islands, by A. Ritter von Samo, and the other being an important contribution to Turkish ethnology by Herr Carl Sax, Austrian Consul at Adrianople. The paper and map of the latter show both the race and religion and language of the various divisions of the country, three items which are often confounded.

THE Japanese are certainly making great strides in the way of harbour improvement and the extension of means of inland communication, affording thereby a direct contrast to the exclusiveness and obstructiveness of the Chinese. The Doboku-Kioku (Bureau of Construction) now propose to construct a harbour at Samusawa in Miyagi, at a cost of 350,000 yen. It is also said that the Japanese Government desire to raise a home loan of 10,000,000 yen for the purpose of connecting Lake Biwa, in the province of Omi, by a canal with the river Uji, to bring the waste lands in the province of O-u under cultivation, and in order to connect Kioto with the Bay of Tsuga by railway.