ried; tattooing being, with the female sex, one of the privileges of matrimony.

No communal practices appear to have attracted the author's attention; but the statement made, that among the Sandjoeng Dyaks there are only "a couple of houses in each village, but so large as to contain between them the whole population of 400 or 500," is of interest, since it carries with it the implication of some form of communal life. In another place these communal dwellings are described as from eighty to a hundred and sixty feet in length, twenty to thirty feet in width, and with walls about ten feet high, the ridge of the roof rising another five or six feet.

The house proper has but one floor, raised on posts of ironwood about fifteen or twenty feet from the ground, which forms the actual residence, under which is a second floor, from four to six feet from the ground, which serves for many domestic purposes, to hold councils in, and as a playground for the children.

The fact, that, "whenever a deer is killed, every inhabitant of the village receives a share," the one actually shooting the animal having the right to the horns, also clearly points to the existence of well-defined hunting-laws rooted in communal principles.

Judging from the description given, the Dyaks would seem to possess many savage virtues. They were found by the author to be singularly temperate both in eating and drinking. The only native intoxicant is 'toewak,' — a drink made from wild honey. When offered brandy, they refused it, exhibiting a strong distaste even to its odor; nor could they be induced to more than taste it. They indulge to excess, however, in betel-chewing, — a habit for which they are indebted to the Malays.

In mental capacity the Dyaks are stated to be on an equality with the Malays; but they are more energetic, and more willing to work. The author attests their truthfulness, and states that thefts and robberies are entirely unknown among them. On the other hand, they were found to be most importunate beggars.

The chief industrial occupation of the Dyaks is stated to be agriculture, both sexes taking part in the labors of the field. As usual, the heavier portion falls to the lot of the women, who are said to be 'the only beasts of burden.' Rice is the main crop; but bananas, sugar-cane, and a few cocoanuts are also raised. The production, however, only suffices for immediate wants, and in times of drought great distress always ensues.

The cutting of rattan to supply the Malay trade is the next most important occupation. Considerable quantities of gutta-percha are also collected, but in so wasteful a manner, as, in the author's opinion, to threaten the future supply.

The gathering of wax from the nests of the indigenous bees is also an important industry; and twice a year the edible nests of the swallow (Hirundo esculenta) are collected for sale to the Chinese.

The medical practices of the Dyaks appear to be strictly analogous to those of other savages. Certain plants are employed as remedies; the task of concocting the medicine, and administering it, devolving mainly, as appeared to the author, upon the women, who also do what nursing is required. The main reliance, however, for the cure of disease, is in charms and sorcery.

Curiously enough, symptoms of the prevalent Darwinian theory seem to have penetrated these far-off regions; and, while visiting a village of Dyak in the interior, the author found a strong belief in the existence of people with tails in a country but a few days distant. To use his own words, "such definite statements were made to me on the subject, that I could hardly resist the temptation to penetrate myself into the stronghold of my ancestral representatives." He contented himself, however, with hiring one of the natives to go in his stead, with, needless to say, quite unsatisfactory results.

In appendices are given lists of land and fresh-water shells collected by the author in Borneo and Sumatra, with descriptions of new species; a list of birds collected on the west coast of Sumatra; a list of Sumatra butterflies; and a short vocabulary of the Long Wai (Dyak) dialect.

The volume is copiously illustrated with lithographic plates from the author's original drawings. These, if not remarkable for artistic excellence, yet serve well the purpose for which intended.

GEOLOGICAL MAP OF BELGIUM.

THE appearance of the first sheet of the new *Carte géologique de la Belgique, dressée par ordre du gouvernement* introduces to us a new system of geological cartography, which in many respects is more perfect than any thing yet attempted by a geological survey. The system adopted shows truly the real geology of the country, but gives an imperfect idea of the general distribution of the strata. This, however, can be readily shown on maps of a much smaller scale. The sheet which has just appeared is that of Cinney: it is on the scale of 1 : 20,000, the topography being indicated by 10-metre contour lines. The outcrops are drawn as they are found, and colored with even tints. The theoretical limits of the strata are defined by degraded tints of the same color as that used to designate the outcrops of the same formation. If two outcrops are visible (as with the carboniferous limestone, which is locally covered with sands), the diagrammatical extension of these is represented by fine dots of the color of the sands. The light colors in even tints are, on the contrary, reserved to represent the general disposition of the superficial quaternary and modern deposits. These have been studied carefully, especially with the help of borings; and the lettering on the map indicates the exact spot of each sounding. A short, straight, black line is used to represent the strike of the beds; and a small point, like an arrow-head, projecting from it, indicates the direction of the dip, while a number engraved on the other side of the line shows its angle. Forests where no outcrops are visible are left uncolored. Where the superficial deposits consist of the detritus of a known formation, the fact is indicated by equidistant broken lines of the same color as that used to designate the outcrop of which they are the waste.

Owing to the largeness of the scale, and the accurate topography of the maps of the war department, the geologists of Belgium have been enabled to make a true representation of the geology of Belgium as shown by the outcrops of rocks that are visible, and the superficial and surface deposits; placing on the map merely what is known and can be seen, without leaving any room for theoretical views of extension of formations to creep in and create errors, as they nearly always do. When the map is completed, it will consist of 430 sheets; besides which, there will be published a number of atlas-sheets of sections on a scale of 1:5,000. Accompanying each sheet of the map, an explanatory text will be published, containing a plate on which will be drawn three diagram-

matical sections cutting the map north and south at equal distances of twenty-seven hundred metres, showing theoretically for the whole country the subterranean distribution of the beds. In the tertiary formations an equal number of transverse sections will accompany the sheets. In the field-work, each formation will be studied monographically. One of the features of the reports will be the remarks on the subterranean hydrography. The present sheet has been prepared by the director of the survey, Mr. E. Dupont, for the carboniferous, and by Mr. Michel Mourlon for the Famennien or upper Devonian. In the accompanying text are a number of detailed sections printed on thin India paper, colored chromolithographically, and afterwards pasted in their proper place; there is also a small colored sketch-map showing the distribution of the formations in Condroz and Entre-Sambre-et-Meuse. The text is a large octavo of 66 pages.

The geological maps of Dumont have always been cited as models. By publishing the present map, the Belgian government preserves its high position as a leader in geological research. J. B. MARCOU.

LETTERS TO THE EDITOR.

Flight of the flying-fish.

IN 1871 (*Proc. Bost. soc. nat. hist.*, xiv. 137), from observation of the flying-fish in the Central-American and Hawaiian Pacific, I expressed the opinion that their flight was something more than sustaining themselves in the air by a parachute-like membrane. In the Indian ocean, in 1882, they flew from before our steamer in immense numbers; and I had ample opportunity to watch them in smooth and rough seas, and am confirmed in the statement then made, that they have the power of directing their flight. Admitting that, as a general rule, their course in the air is a continuation of their onward and upward passage through the water, and its duration as long as the expanded pectorals are moist enough to permit the rapid vibrations by which they skim along near the surface, I am sure that they can, even without touching the water with their long, lower caudal lobe, turn to the right or left, rise or fall to avoid a wave, and change direction, almost like a bird. I have often seen them sustain a flight of over a minute by my watch, and traverse several hundred yards, apparently half a mile. Their lot seems a hard one. Exposed to porpoises, dolphins, and voracious fishes, in the sea, and to marine birds in the air (happily few in these waters), what appears mere joyous amusement is really a race for life. S. KNEELAND.

Use of wire in sounding.

Since preparing the memorandum on the early use of wire in sounding (SCIENCE No. 3, p. 65), my attention has been called to two other instances of its use It appears that the wire used by Walsh was of steel, though this is not stated in the log-book. And, in addition to the ten-pound sinker, there was a registering apparatus of six pounds' weight, designed by Maury, used on at least one of the casts, according to Capt. Belknap, but not mentioned in the record.

In the same year in which Walsh made his preparations, Capt. Barnett, R.N., of H. M. S. Thunderer, on her way to the Azores from America, sounded, August, 1849, with iron wire and a sixty-one pound sinker. Only one attempt was made, and the wire broke at 2,000 fathoms. It would seem possible, that, while the Thunderer was in America, some communication might have passed between the American and British naval officers which resulted in the attempts of Walsh and Barnett.

However, a still earlier attempt to employ wire was made, which, for the present at least seems to be the earliest instance of its use. This was on the U.S. exploring expedition under Wilkes, when copper wire about three thirty-seconds of an inch in diameter, with twisted and soldered splices, appears to have been furnished to most of the vessels — at whose suggestion I have been unable to discover. The experiments were unsatisfactory, owing to constant parting of the wire; and, before the return of the expedition in 1842, the plan was abandoned. An admirable discussion of this topic, contributed by Capt. George E. Belknap, U.S.N., will be found in Hamersly's Naval encyclopaedia (Philadelphia, 1881).

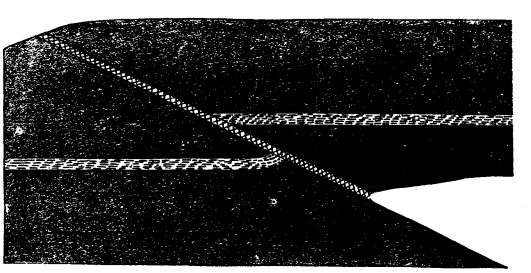
WILLIAM H. DALL.

Peculiar faulting of a coal-bed.

In a drift opening in the Pittsburg (Ohio No. 8) coal, near this place, there is exposed a rather exceptional faulting of that seam.

The fault occurs ninety yards from the mouth of the mine, where about forty feet of strata lie over the coal. The slope of the surface is quite uniform from the opening to the point of fault, whence the rise is more rapid for a short distance, when the surface becomes a level ridge, from which it falls in all directions.

In the accompanying cut of the fault, which is longitudinal in relation to the entry, the horizontal



EAST. WEST.

dotted space represents the 'inbearing vein,' so persistent in the Pittsburg coal. The sloping checkered space represents the pulverized smutty coal on the line of fault, having a slope of about 30°. The bottom coal is very uniform as to thickness, except at the fault, where, from duplication and crushing in a horizontal direction, it is considerably thickened. The condition of the top coal is very different. From the fault to the mouth of the mine it varies from 12 to 20 inches, with a roof of slickensided 'soapstone,' while, immediately beyond the fault, it assumes a very uniform thickness of 30 inches.

On the east or under side of the fault, the edges of the layers of coal and slate partings are undisturbed, even immediately in contact with the crushed line. On the west side the layers and partings are all bent down where they come to the line of fault, as shown in the cut, in which the dark lines in the body of the coal represent slate-partings. Some of the layers of coal are pursed and distorted where they come to the fault. The immediate contact of the fault with the underlying fire-clay is concealed by a tramway. At all other parts of the fault, where it crosses the entry, its character is very plain. The wedge-shaped edge of the upper coal is cut off very abruptly at the line of fault, as prolonged at its normal slope up into the shale. The 'inbearing vein' is about twelve inches