of the greater portion of the partitions separating the chambers, pillars of chalk only being left to support the roof. The usual height of denehole chambers may be said to be from ten to twenty feet. A leading characteristic of deneholes is the separation of each pit from its neighbor, though they are often so close together that much care must have been exercised to prevent intercommunication. Another is the fact, that, while they are here and there abundant in bare chalk, they are often especially numer-

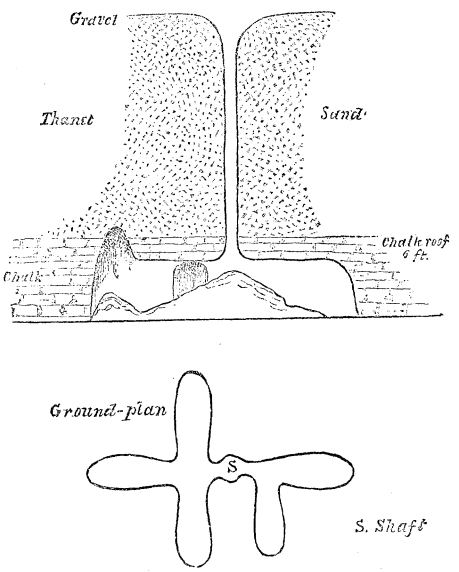

Fig. 2.

ous where the top of the chalk is fifty to sixty feet below. Thus at Hangman's Wood, for example, the top of the chalk is fifty-six or fifty-seven feet below the surface, while there is plenty of bare chalk within a mile.

Though there are more than fifty separate deneholes in Hangman's Wood, each shaft being at an average distance of about twenty-five yards from its nearest neighbor, only five shafts are now open, the rest having fallen in at various times. In most instances, however, there is nothing to suggest that the chambers below have been materially, if at all, injured, the funnel-shaped hollow at the surface being but little greater than those around the mouths of shafts still open. This closing of the great majority of the shafts is not by any means simply disadvantageous to denehole explorers, though it certainly increases the cost of exploration; for it is obvious that closed pits necessarily afford more satisfactory evidence than such as have been visited from time to time, either from curiosity or to recover a lost sheep or hound.

Preliminary examinations of six of the deneholes in Hangman's Wood were made during the summers of 1882 and 1883. A more thorough investigation is now in progress.

RECENT AFRICAN EXPLORATION.

No news has been received at Zanzibar from Giraud since he was deserted by his caravan. A number of the deserters have been arrested and imprisoned under grave charges, but their trial will be deferred until some definite information of the traveller's fate has been received. The French consul asserts, with reason, that an example must be made if it proves that Giraud has been betrayed: otherwise there can be no safety for future explorers.

The distressing news has been received of the total destruction by fire of the fine establishment of the missionaries du Saint-Esprit at Mrogoro. They were left without food or clothing, and the result of their severe labor for two years was destroyed at one blow. The fire would seem to have been accidental; since the natives about them are friendly, and have modified, at the suggestion of the missionaries, many of their savage customs, especially that of human sacrifices, which a year ago were common. Assistance has been sent to the sufferers.

From the Zambezi, news of the death of Commander Foot has been received. It occurred at Blantyre, where he had been appointed English consul. His wife and two children, unable during the prevalent disorders on the upper Zambezi to reach the coast, have taken refuge at the Protestant mission at the junction of the Ruo and Sheri rivers. The deceased was well known in connection with African exploration, and especially with routes of trade and travel in central Africa.

Mr. Hore of the English missionary society has recently started for Ujiji, with his family, a considerable caravan, and two young missionaries, who will assist him in his work.

Some time since, we referred to the operations of Paul Soleillet in the region of Shoa, and his success in establishing friendly relations with King Menelik. The traveller, who left France about three years ago, has now returned to civilization, and, at a recent séance of the Société de géographie, gave interesting details of his journey, and of the character of the region explored by him in the interests of French commerce. The port of Obok, opposite the English military station of Aden, has been occupied by France since 1856, but has only been raised to the rank of a naval coaling-station during the past year.

Behind Obok rises the irregular surface of the Ethiopian highlands, extending westward to the Nile, and southward to the little-known region which encloses the great lakes of equatorial Africa. At different altitudes on its ridges, which rise from five thousand to eleven thousand feet, one finds a succession of all the climates of the torrid and temperate zones. The olive, cypress, indigo, and coffee plants grow wild there; while cotton, sugar-cane, the vine, and cereals are successfully cultivated. In the same regions where the elephant, buffalo, and rhinoceros flourish in a state of nature, one finds innumerable herds of cattle, sheep, and horses. Soleillet succeeded in opening a caravan route to Kaffa by way of Shoa, which is subject to the usual objections of time and

expense, twenty or thirty days being required to reach the highlands from Obok. However, the only route previously available took forty or fifty days for the same transit. Transportation is very expensive, reaching four or five hundred dollars per ton; so that only the most valuable goods, such as arms and ammunition, can be profitably sent in, and gold, ivory, and musk brought out. However, Shoa has a population of three millions, intelligent and semi-civilized, whose manners and customs approach those of Europe, who are Christians, and are governed by a code of laws derived from the Institutes of Justinian. The construction of a railway of two or three hundred miles in length would open an immense market for the manufactured goods of Europe. Soleillet's labors have been rewarded by the cross of the legion of honor.

INGERSOLL'S COUNTRY COUSINS.

MR. INGERSOLL'S 'Short studies in natural history' is a revised reprint of a number of handsomely illustrated articles on a variety of subjects, which have recently appeared in various popular magazines. Of the twenty-one chapters, three are devoted to birds; one each to shrews and seals; three to oysters and their enemies; one each to rattlesnakes, squids and their allies, elk-antlers, the pompano shells, the caverns at Luray and at Pike's Peak, the abalone, shell-money of the American Indians, etc. On many of these subjects the author writes from personal observation; but much of the book, as might be expected, is compiled. In detailing his own observations, he seldom wanders from the mark; but, in treating subjects at second hand, he is occasionally betrayed into misstatements, either through inattention or by his authorities, whom he is not in position to properly weigh. We are surprised, for instance, that he should soberly repeat the assertion that mocking-birds are able to kill large snakes by beating them with their wings. He shows a not very clear conception of his subject, when, in speaking of the shrews, he states that the smallest American species belong to the genus Blarina; nor is this the only glaring inaccuracy in the chapter on these animals. A very excellent account of the large-billed water-thrush (Siurus motacilla) is marred at its close by the statement, 'This is a northern bird,' — the opposite of the truth, when contrasted, as here, with the small-billed species. Equally careless and inexcusable is the statement that martens, as well as weasels and ermines, turn white in winter. The interesting and very sensible article on 'Rattlesnakes in fact and fancy,' however, while not wholly free from errors, treats the subject of 'mimicry' in relation to the rattles with commendable judgment. In the account of star-fishes as enemies of the oyster, there are some overdrawn statements respecting the power of multiplication by division possessed by star-fishes. In the chapter on 'Periwinkles and other oyster-pests,' the large 'winkles,' or 'conchs,' of the genera Sycotypus and Fulgar, are erroneously stated to be unprovided with a lingual ribbon of teeth. The quahaug is said to be usually safe from the ravages of these species; but this is by no means the case, since at some localities we have found the quahaug to be their principal prey, even the largest specimens not escaping their rapacity. It is stated, on the authority of 'an intelligent man,' that Fulgar carica is able to draw even the razor-shell out of its burrow, and devour it; while the fact is that this is done by even very young examples. The chapter on 'Seals and seal-hunting in the North Atlantic' is far from accurate in many of its statements; but, strangest of all, under the page-heading 'A bit of comparative anatomy,' we are told that the tail of the whale, and of cetaceans in general, is not a 'tail' at all, but is structurally homologous — having the same component bones — with the hind-flippers of a seal and the hind-limbs of other mammals. Not to cite other frequent evidences of either carelessness or ignorance, the foregoing will show that a very readable, and in the main commendable, book may contain faults of a very serious character. The author tells us the book is written in the hope that it may "contain not only some entertainment, but also helpful suggestions for those who take delight in outdoor studies." It certainly does contain a very large amount of interesting information very entertainingly told, few writers of popular natural-history books having either the literary ability or the knowledge shown by Mr. Ingersoll in the present series of papers. It is the greater pity that here and there he should be found so grievously tripping.

The book is very carefully and attractively printed, and the illustrations are artistic and fitting; but even here the frontispiece is entitled 'Tree toads,' while only one of the two species figured is a tree-toad, though both are placed *on a tree;* the other being the wood-frog, and as such is correctly referred to in the text. In the explanation of the cut of a shrew's skull (p. 35), 'under side of skull' should be 'upper side of skull.'

Country cousins: short studies in the natural history of the United States. By ERNEST INGERSOLL. New York, *Harper & brothers*, 1884. 252 p., illustr. 8°.