one of his hearers. It is certainly one of general interest, and Prof. Morselli's treatment of it, at once an attractive and a thoroughly scientific one, will draw to his valuable book the attention it deserves.

The Formation of Vegetable Mould through the Action of Worms, with Observations of their Habits. By Charles Darwin. With Illustrations. New York: D. Appleton & Co. 1881. Pp. 326.

ONE of the secrets of Mr. Darwin's success in interpreting nature lies in his ability "to sum up the effects of a continually recurrent cause," however slight the momentary results may appear. The means by which he has produced such a marvellous change in modern modes of thought respecting the origin of species are similar to those used with such effect forty or fifty years ago by Lyell to establish a similar principle respecting the action of inanimate forces in geology. The volume before us—the result of forty years of careful observation—would have delighted the author of the 'Principles of Geology,' for it illustrates in a striking manner the enormous geological effects which may be produced by a cause supposed to be insignificant, but which, as usual, turns out to be *unnoticed* rather than insignificant. Mr. Darwin estimates that there are in gardens 53,767 worms to the acre, and that they would weigh 356 pounds. Having four or five gizzards apiece, each worm is able to digest a large amount of coarse food, and to eat his "peck of dirt" in a brief space of time. Careful weighing of the "castings" brought to the surface by worms shows that they sometimes amount to sixteen tons per acre annually—sufficient to produce two inches of so-called "vegetable mould" in ten years. Since worms often burrow to a depth of seven or eight feet, it follows that they may play no mean part in undermining and burying loose stones and monuments of art. Through their agency a field near Mr. Darwin's house has been cleared of cobble stones within his remembrance, and this not so much from the fact that the pebbles have been undermined as because fine earth has been brought to the surface. Many of the foundations of Roman buildings recently discovered in Great Britain are preserved underneath this constantly accumulating deposit of "earth mould," which is from two to three feet deep over the ruins at Wroxeter. We shall wonder if some bold theorist does not soon attempt to account for the prairies of the West as the work of worms. The same action of worms which, in favoring circumstances, covers the surface with humus, in other circumstances promotes denudation, since it exposes the fine earth to the action of both wind and water.

The literary skill of Mr. Darwin appears to special advantage in this volume. He has invested a most unpromising subject with the charm of a romance, his style reminding one of Robinson Crusoe. Children, as we know from experience, read the volume with eager interest, and the philosopher may find much food for reflection in the amount of intelligence described as displayed by an animal so devoid of senses as Mr. Darwin proves the worm to be. Feeling and a faint sense of smell seem the only avenues through which the objects of sense perception penetrate the worm's mind, yet worms show signs of fear, are somewhat social, and have some power of attention; but we are sorry to say they are cannibals. After perusing the book it is difficult not to share in the enthusiasm of the author's closing paragraph:

"The plough is one of the most ancient and most valuable of man's inventions; but long before he existed the land was in fact regularly ploughed, and still continues to be thus ploughed, by earthworms. It may be doubted whether there are many other animals which have played so important a part in the history of the world as have these lowly-organized creatures."

The Hero of Cowpens. A Centennial Sketch. New York: A. S. Barnes & Co. 1 vol. 8vo.

THE preface to this volume contradicts its title. The hero of Cowpens stand on cover and frontispiece, while the prologue promises to show him the hero of all for which Arnold has been praised. The contrast is not needed for Morgan's fame, which shines distinct and peculiar among Revolutionary reputations. This memoir states, with complete frankness, the obscure origin, the narrow early life, and the lack of education or social influence of its subject. The striking features of the portrait redeem the commonplace setting, for which there is therefore the less need of such apology as is offered in suggestions of what parentage the Greeks in like case would have invoked, and in the boast that he was "the son of God, who is able to raise up his children from the stones."

Daniel Morgan was a yeoman commander. Not used to be called in counsel upon great operations, nor placed in separate responsible command, his qualities made him invaluable as an auxiliary in a war waged with militia levies in a rude country. They were promptness, subordination, close sympathy with his men, and the special training, for him and them, of experts in woodcraft and sharpshooting. Courage and endurance were matters of course, and honor and honesty innate with him. He was an aid for the most part to commanders of no high capacity. But the work he had to do was not the worse done because it was sometimes ill guided. What was laid upon him he performed perfectly, and it may be that more generous leadership might have afforded him greater occasion for independent achievement. His hardy constitution and rough early training enabled him to carry his men with little loss to the end of Arnold's Quixotic winter march through the wilds and torrents of Maine. In the assault on Quebec he was the only captain who fulfilled his task, actually taking a battery, entering the lower town, capturing "whole platoons" of prisoners, and carrying all before him till Montgomery's fall defeated the attack, and compelled his surrender. On his release, after eight months' captivity, the same qualities of hardiness and vigilance commended him to Washington, who placed him in command of 500 picked men, serving through the Jersey campaign on scouting and outpost duty, and on occasion as formidable skirmishers. In a letter to Washington, written four years later, he regrets that "during the whole course of the war he had never on any important event had the honor of serving particularly under him." Transferred to the northern army of Gates, he justified Washington's expressed dependence on him, his officers, and men. At Bemus' Heights the most stubborn fighters were his marksmen, and the decision of Saratoga hung upon the rifle-ball that by his special orders cut down Fraser. Yet he was barely mentioned to Congress, and not at all rewarded by them. After Burgoyne's surrender, eighteen months of service near Philadelphia and at Valley Forge followed, severe and skilful, but not conspicuous. In June, 1779, impaired health, together with a keen feeling of the neglect of Congress and the slight recognition of his value as an officer, led to his resignation.

Upon Gates's appointment the following year to a Southern command, he sought the help of Morgan once more. The retired colonel accepted such amends as he offered for his own injustice, but refused for a time to serve without deserved promotion. Moved at last by the wretchedness of South Carolina, whose citizens, says Bancroft,