who are fortunate enough to possess or to have seen Dr. Scudder's great work: 'The butterflies of the eastern United States and Canada,' a work so costly as to have but a limited circulation, will recognize these chapters, which form the delightful excursuses of the two volumes of text. They are charmingly written, and are mainly the result of the author's own observations, and in their present form deserve the widest reading. It would prove a beautiful present for a boy or girl interested in insects, and also afford pleasant summer reading for older minds, since few technical terms are used.

There are a number of plates containing figures reproduced from the larger work. In the matter of index, printing, paper and general appearance we not only have no fault to find, but everything to commend. A. S. P.

Third Report of the Board of Managers of the New York State Colonization Society, by O. F. Cook, Fulton Professor of Natural Sciences in Liberia College. 1896. 8°, 100 pp.

This report is a plain recital of careful observation on plants, animals, and men in the Republic of Liberia; the observations are recorded in simple, straightforward fashion, and are of considerable interest and value, albeit in an unexpected medium.

Over 30 pages are devoted to the flora and fauna; 30 or 40 plants are identified in an annotated list, and the notes touch on a variety of characteristics and uses of the plants and their products; *e. g.*, it is pointed out that the seeds of the mangrove germinate on the trees, sending out long sharp-pointed radicles, which hang pendent until the weight breaks attachments, when they drop into the mud and are thus planted right side up and so firmly as to resist tidal currents; *Urena lobata* 'is protected by ants for the sake of a secretion which is elaborated and exuded by a small gland at the base of the midvein;' the banana and bread fruit flourish, yet their products cannot be made exclusive articles of diet, as is commonly supposed, etc. There is a surprising dearth of mosses and parasitic fungi and lichens in Liberian forests, and it is noted that 'in nearly all natural groups the number of species is much larger than in the same area in North America, even though the number of individuals may be less for the group as a whole' (page 5). There is a comforting dearth, also, of snakes, mosquitoes, flies and minor pestiferous insects, which seems to be correlated with the wealth of ants, both in species and individuals. The habits of the 'driver' ants, the natural scavengers of the district, are described in detail, as are those of the termites, which appear to cultivate a fungus to supply food for the young and the queens. It is noted that the chimpanzees (called by the natives 'old-time people') dig land crabs out of their burrows and crack them on stones,* and are said also to crack nuts between stones, 'quite man fashion,' and to grasp the python by the neck and bruise its head with a stone (page 22).

The social conditions of Liberia are described in fair detail; and it is shown that, while slavery is prohibited by the Liberian constitution, there is a modified slavery of hireling service which has degraded the servitors and still more seriously enfeebled the served, who 'rarely gain habits of industry or self-reliance, and with no proper school advantages * * * reach maturity too often as examples of physical and mental weakness' (page 45). Even more interesting is the naïve description of the 'missionary slave trade,' from which it appears that evangelization begins with actual purchase of the youth whom it is desired to Christianize and civilize! "In the interior of Liberia [slave] boys 12 and 14 years old were offered me for goods of a cash value of about $3. Girls come at about twice the price. * * * * When it comes to buying free children of their parents the price may exceed the figures mentioned" (page 40). "The only apparent reason why this department of the slave trade has not assumed proportions sufficient to attract general attention, has been the lack of funds in the hands of the would-be buyers" (page 38). In

*Major Battersby, in describing the 'Pets and Pests of the Barbadoes' (*Chambers Journal*, March 14, 1896), mentions a Capuchin monkey which captures crabs in related fashion: "His method * * * is to knock it about with his paw by quick pats until it is sufficiently dazed to give him a chance of smashing its claw with a large stone" (*Literary Digest*, Vol. XII., 1896, p. 717).

one case a missionary intending to remove to Angola was not permitted to carry her purchased pupils with her; 'thus has a negro government interfered to prevent a white missionary from taking native children 2,000 miles from their parents and kindred, in accordance with the plans of a missionary bishop' (page 43). The text contains comparatively little of ethnic interest save in scattered morsels, for, as is usual in evangelizing and civilizing enterprises, it is considered that no good thing can come from the Nazareth of the primitive; but some of the mechanically reproduced photographs illustrate the features, costume and customs of the natives, the appearance of their barricaded towns, etc., while the numerous cuts give faithful pictures of flora and landscape, and admirably supplement the simple and modest description in depicting Liberia as it is.

It is announced that the society, though retaining its original name, long since gave up its adherence to any scheme of colonization, as such, and now confines its activities to education and practical questions. A note indicates that additional copies of the report can be obtained by applying to Charles T. Geyer, Secretary, 19 William street, New York City.

W J McGEE.

WASHINGTON, D. C.

SCIENTIFIC JOURNALS.

AMERICAN JOURNAL OF SCIENCE.

THE May number opens with an article by John Trowbridge, discussing the probable presence of carbon and oxygen in the sun. This is in the line of work earlier done (1887) by the same author in combination with C. C. Hutchins, in which they showed that the carbon bands could probably be detected in the sun's spectrum, although nearly obliterated by the overlying absorption lines of other metals, particularly those of iron. Some quantitative experiments have been now carried out by the author to show what relative proportion of iron mixed with carbon dust was required in order to produce this effect of obliterating the carbon bands. Pencils, made of carbon dust and iron (reduced by hydrogen) uniformly distributed through it, were employed. The solar spectrum near the carbon band at wave-length 3883.7 was then photographed, also below on the same plate the pure carbon banded spectrum, and finally, immediately below this, the spectrum of the mixture of iron and carbon. It was found that from twenty-eight to thirty per cent. of iron, in combination with seventy-two or seventy per cent. of carbon, almost completely obliterated the peculiar banded spectrum of carbon. This proportion, therefore, of iron in the atmosphere of the sun, were there no other vapors of metals present, would be sufficient to prevent our seeing the full spectrum of carbon. The author then goes on to consider the case of oxygen and remarks that the question whether oxygen exists in the sun is closely related to questions in regard to the presence of carbon, when the temperature and light of the sun are considered. The regions in the solar spectrum where the bright lines of oxygen should occur if they manifest themselves have been carefully examined in order to see if any of the fine absorption lines of iron in the spectrum of iron were absent, for it is reasonable to suppose that the bright nebulous lines of oxygen would obliterate the faintest lines of iron. The result is to prove that the faintest iron lines are not obliterated in the spaces where the oxygen lines should occur.

The author concludes by remarking that, although he has not succeeded in detecting oxygen in the sun, it seems to him that the character of its light, the fact of the combustion of carbon in its mass, the conditions for the incandescence of the oxides of the rare earths which exist, would prevent the detection of oxygen in its uncombined state. Notwithstanding the negative evidence brought forward, he adds that he cannot help feeling strongly that oxygen is present in the sun and that the sun's light is due to carbon vapor in an atmosphere of oxygen.

An extended article by Harold Jacoby gives a minute mathematical discussion of the determination of the division errors of a straight scale. T. Holm gives the results of studies upon the *Cyperaceæ*, with reference to the monopodial ramification in certain North American species of *Carex*. It is shown that the monopodial character is especially well represented on this side of the Atlantic and may indeed be said to be prevalent among our sylvan forms. The article