

a sportsman and a naturalist. One chapter is devoted to this, but we doubt if it does full credit to Baker's work in this field. His valuable contributions to natural history are barely referred to; his important services to gunnery and his improvements in cartridges are not mentioned. We should have been glad to have seen more space devoted to this, at the cost of condensation of the political writings, some of which are hardly likely to add to his reputation. For when we remember the conditions under which he shot, the clumsy old muzzle-loaders and the badly-mixed powders he used, and the accuracy and fulness of his observations upon the habits of animals, we cannot but reckon Baker as the greatest of English sportsmen.

While Baker's memoir gives an account of the political conditions of the Soudan from 1860 onward, Prof. Keane's admirable summary of the present knowledge of North African geography completes the sketch in other departments. He divides North Africa into six divisions, viz. the Atlas (including Morocco, Algiers and Tunis), the Sahara, the Soudan and the Niger Basin, Egypt and Nubia, and Italian North-East Africa (including Abyssinia and Somaliland). Each of these districts is described separately, an account being given of its general physical geography, of its history, as far as this is known, of its ethnography, and natural history. The ethnographical sketches are especially well done, while the political histories are the most detailed. The natural history is the least satisfactory part of the book. The geology is mostly quoted second-hand, or is taken only from geographical instead of from geological papers. Some of the botanical records are certainly quite untrustworthy, as when on p. 533 *Casuarina* is reported on the banks of the Webi Shebeyli, whereas it occurs only on the ends of the promontories on the eastern coasts. The nine maps are admirably clear, while full of information. The volume is in every way a great improvement on the preceding editions. The immense increase in the material to be summarised, has made the task a difficult one. This enormous growth of knowledge applies, however, to five out of the six districts described. It is only in one that progress has been stopped, and of which the new edition has nothing fresh to report, except paper delimitations in Europe and reaction in Africa. All Junker's collections, the greatest ever made in the equatorial provinces of Egypt, were lost by the closing of the Soudan. It is to be hoped, however, that European officials will not much longer prohibit our representatives in the field from taking action, and again opening to progress the lands where Gordon's death and Baker's life-work added their names to the roll of our national heroes.

J. W. G.

BIO-OPTIMISM.

The Evergreen. A Northern Seasonal. Published in the Lawnmarket of Edinburgh by Patrick Geddes and Colleagues. (London: Fisher Unwin, 1895.)

IT is not often that a reviewer is called upon to write art criticism in the columns of NATURE. But the circumstances of the "Evergreen" are peculiar; it is published with a certain scientific sanction as the expression of a coming scientific Renaissance of Art, and it is impossible to avoid glancing at its æsthetic merits. It is a semi-

annual periodical emanating from the biological school of St. Andrews University. Mr. J. Arthur Thomson assists with the proem and the concluding article ("The Scots Renaissance"), and other significant work in the volume is from the pen of Prof. Patrick Geddes. It may be assumed that a large section of the public will accept this volume as being representative of the younger generation of biological workers, and as indicating the æsthetic tendencies of a scientific training. What injustice may be done thereby a glance at the initial Almanac will show. In this page of "Scots Renaissance" design the beautiful markings on the carapace of a crab and the exquisite convolutions of a ram's horn are alike replaced by unmeaning and clumsy spirals, the delicate outlines of a butterfly body by a gross shape like a soda-water bottle; its wings are indicated by three sausage-shaped excrescences on either side, and the vegetable forms in the decorative border are deprived of all variety and sinuosity in favour of a system of cast-iron semi-circular curves. Now, as a matter of fact, provided there is no excess of diagram, his training should render the genuine biologist more acutely sensitive to these ugly and unmeaning distortions than the average educated man. Neither does a biological training blind the eye to the quite fortuitous arrangement of the black masses in Mr. Duncan's studies in the art of Mr. Beardsley, to the clumsy line of Mr. Mackie's reminiscences of Mr. Walter Crane, or to the amateurish quality of Mr. Burn-Murdoch. And when Mr. Riccardo Stephens honours Herrick on his intention rather than his execution, and Mr. Laubach, rejoicing "with tabret and string" at the advent of spring, bleats

" Now hillock and highway
Are budding and glad,
Thro' dingle and byway
Go lassie and lad."

it must not be supposed that the frequenters of the biological laboratory, outside the circle immediately about Prof. Patrick Geddes, are more profoundly stirred than they are when Mr. Kipling, full of knowledge and power, sings of the wind and the sea and the heart of the natural man.

But enough has been said of the artistic merits of this volume. Regarded as anything more than the first efforts of amateurs in art and literature—and it makes that claim—it is bad from cover to cover; and even the covers are bad. No mitigated condemnation will meet the circumstances of the case. Imagine the New English Art Club propounding a Scientific Renaissance in its leisure moments! Of greater concern to the readers of NATURE than the fact that a successful professor may be an indifferent art editor, is the attempt on the part of two biologists—real responsible biologists—writing for the unscientific public, to represent Biology as having turned upon its own philosophical implications. Mr. Thomson, for instance, tells his readers that "the conception of the Struggle for Existence as Nature's sole method of progress," "was to be sure a libel projected upon nature, but it had enough truth in it to be mischievous for a while." So zoologists honour their greatest! "Science," he says, has perceived "how false to natural fact the theory was." "It has shown how primordial, how organically imperative the social virtues are; how

love, not egoism, is the motive which the final history of every species justifies." And so on to some beautiful socialistic sentiment and anticipations of "the dominance of a common civic ideal, which to naturalists is known as a Symbiosis." And Prof. Geddes writes tumultuously in the same vein—a kind of pulpit science—many hopeful things of "Renaissance," and the "Elixir of Life."

Now there is absolutely no justification for these sweeping assertions, this frantic hopefulness, this attempt to belittle the giants of the Natural Selection period of biological history. There is nothing in Symbiosis or in any other group of phenomena to warrant the statement that the representation of all life as a Struggle for Existence is a libel on Nature. Because some species have abandoned fighting in open order, each family for itself, as some of the larger carnivora do, for a fight in masses after the fashion of the ants, because the fungus fighting its brother fungus has armed itself with an auxiliary alga, because man instead of killing his cattle at sight preserves them against his convenience, and fights with advertisements and legal process instead of with flint instruments, is life therefore any the less a battle-field? Has anything arisen to show that the seed of the unfit need not perish, that a species may wheel into line with new conditions without the generous assistance of Death, that where the life and breeding of every individual in a species is about equally secure, a degenerative process must not inevitably supervene? As a matter of fact Natural Selection grips us more grimly than it ever did, because the doubts thrown upon the inheritance of acquired characteristics have deprived us of our trust in education as a means of redemption for decadent families. In our hearts we all wish that the case was not so, we all hate Death and his handiwork; but the business of science is not to keep up the courage of men, but to tell the truth. And biological science in the study still faces this dilemma, that the individual in a non-combatant species, if such a thing as a non-combatant species ever exist, a species, that is to say, perfectly adapted to static conditions, is, by virtue of its perfect reactions, a mechanism, and that in a species not in a state of equilibrium, a species undergoing modification, a certain painful stress must weigh upon all its imperfectly adapted individuals, and death be busy among the most imperfect. And where your animal is social, the stress is still upon the group of imperfect individuals constituting the imperfect herd or anthill, or what not—they merely suffer by wholesale instead of by retail. In brief, a static species is mechanical, an evolving species suffering—no line of escape from that *impasse* has as yet presented itself. The names of the sculptor who carves out the new forms of life are, and so far as human science goes at present they must ever be, Pain and Death. And the phenomena of degeneration rob one of any confidence that the new forms will be in any case or in a majority of cases "higher" (by any standard except present adaptation to circumstances) than the old.

Messrs. Geddes and Thomson have advanced nothing to weaken these convictions, and their attitude is altogether amazingly unscientific. Mr. Thomson talks of the Gospel of the Resurrection and "that charming girl Proserpina," and Baldur the Beautiful and Dornröschen, and hammers away at the great god Pan, inviting all and

sundry to "light the Beltane fires"—apparently with the dry truths of science—"and keep the Floralia," while Prof. Geddes relies chiefly on Proserpine and the Alchemy of Life for his literary effects. Intercalated among these writings are amateurish short stories about spring, "descriptive articles" of the High School Essay type, poetry and illustrations such as we have already dealt with. In this manner is the banner of the "Scots Renaissance," and "Bio-optimism" unfurled by these industrious investigators in biology. It will not appeal to science students, but to that large and important class of the community which trims its convictions to its amiable sentiments, it may appear as a very desirable mitigation of the rigour of, what Mr. Buchanan has very aptly called, the Calvinism of science. H. G. WELLS.

THE GLYPTODONT ORIGIN OF MAMMALS.

Studies in the Evolution of Animals. By E. Bonavia, M.D. (London: Constable, 1895.)

IN his preface the author writes that: "Having completed the 'Flora of the Assyrian Monuments and its Outcomes,' I was looking about for something to take up next as a subject of study. In the furriers' windows I was attracted by the leopard and tiger skins, which by degrees became objects of interesting study and speculation." In the true interests of zoology, it is to be deplored that his attention was not attracted by some other subject.

The key-note to the startling theory propounded in this volume is to be found in a sentence on page 131, where it is stated that: "The Glyptodonts, or other armoured animals of a similar nature, were the *originals* from which all existing mammals, including marsupials, descended."

This astounding statement is largely based on the belief that the rosettes on the skins of the jaguar and leopard are the remnants of the rosette-sculpture on the bony carapace of the glyptodonts, the author stating (p. 124) that these markings "are *inherited* from ancestral plate-impressions of some extinct glyptodontoid form, and have *not* been evolved by a process of natural selection."

How the author can conceive that the *Felidæ* are descended from any glyptodont-like form (by which it may be presumed an edentate is meant) will pass the comprehension of any anatomical zoologist; but all will endorse his remark (p. 163) that "one would indeed require to have lived a good bit of time to witness a Glyptodon changing into a Jaguar." This, however, is by no means all. Later on the author finds evidence of glyptodont affinities in the bosses on the skin of Rhinoceroses, and remarks (p. 217) that "the giant armadillo has its hind feet ungulate, its hoofs are almost exactly like those of the Malayan Tapir; and in some rhinoceroses the incisor teeth are wholly wanting, and that part of the jaw is contracted, not unlike that of the Glyptodon." If this means anything, it means that rhinoceroses are evolved from a veritable edentate glyptodont; and it is thus a pity the author did not enlighten us how the full dentition and claws of a jaguar were also to be derived from such a type.

It would be mere waste of space to state how mar-