

discreetly made between certain supposed species, of which he has examined a large series of specimens in a most exhaustive and painstaking manner.

In Part V. of his memoir Mr. Allen treats of the geographical distribution of the birds of North America, "with special reference to the number and circumscription of the ornithological faunæ." In this essay, which well merits perusal, although it is evident that the author has never made himself acquainted with some of the most certainly ascertained facts of the general distribution of bird-life,* a new and arbitrary division of the world's surface into eight "realms" is proposed.

The division of North America, however, into its constituent sub-faunæ is fully discussed and well worked out. An appendix to the volume contains a list of authorities to be consulted on the geographical distribution of North American birds, which will be useful, although by no means well arranged. Mr. Allen's knowledge of the geography of Central America seems, moreover, to be somewhat imperfect, as Mr. Salvin's articles on the birds of Veragua are placed under "Guatemala," and papers relating to British Honduras (*i.e.*, Belize), the Republic of Honduras, and Nicaragua, are all confounded under one head.

P. L. S.

OUR BOOK SHELF

Sir Isaac Newton's Principia. Reprinted for Sir W. Thomson, LL.D., and Hugh Blackburn, M.A. (Glasgow: Maclehose.)

FINDING that all editions of the *Principia* are out of print, the Glasgow Professors of Natural Philosophy and of Mathematics have issued a careful reprint of the last (third) edition as finally revised by Newton himself; attending, of course, to the *Corrigenda*, but wisely abstaining from the insertion of either note or comment. We have had far too much of such things. Think only of the painfully elaborate notes of poor Bishop Horsley, which deface an otherwise splendid edition, and of the truly amazing comments made by Lord Brougham in his "Analytical Views!" True, these are coarse attempts at painting, or rather at "whitewashing," while the Glasgow professors are quite able to "gild." But even gilding would have had a smack of profanation about it, and we are delighted to have Newton left to speak for himself in the old, imperishable, words whose full meaning is only now gradually dawning on the world. So far as we have compared it with other copies, this edition seems to be better than any of its predecessors; the printing and paper are excellent, and the cuts especially are greatly improved. There is, however, one remark which is forcibly thrust upon us by this performance. How eccentric and inscrutable are mathematicians! Comets are nothing to them; and the greater they are, the less do they seem subject to any law of what would be called common sense by mere average humanity. One man of exceptional genius is found wasting day after day in neatly rounding off a sonnet; anon he calculates, to fifty places more than can ever be required, the root of some transcendental equation. Others occasionally burst from their seclusion and rush wildly into gymnastic feats, high-jinks, and what not; but in cold blood to determine to verify, letter by letter, a reprint of a somewhat bulky Latin book seems a species of self-torture, of which nothing we ever before heard concerning our northern friends, could have led us

* *E.g.* The "Neotropical Region" of Sclater, *i.e.*, South and Central America, is divided between two "realms," an "American Tropical" and a "South American Temperate," than which nothing can be more unnatural, and North America is parcelled out into "three realms!"

to imagine them capable. They have gone through it, however; and, having done it well, deserve our hearty thanks.

Description of an Electrical Telegraph. By Sir Francis Ronalds, F.R.S. (London: Williams and Norgate.)

SIR FRANCIS RONALDS has done well in republishing this portion of his work, which was first printed in 1823. The hope which he expresses in the preface to this reprint that his name "may remain connected with an invention which has conferred incalculable benefits on mankind," is quite justified by the experiments which he made and published many years before the final success of telegraphy. Sir Francis, before 1823, sent intelligible messages through more than eight miles of wire insulated and suspended in the air. His elementary signal was the divergence of the pith balls of a Canton's electrometer produced by the communication of a statical charge to the wire. He used synchronous rotation of lettered dials at each end of the line, and charged the wire at the sending-end whenever the letter to be indicated passed an opening provided in a cover; the electrometer at the far end then diverged, and thus informed the receiver of the message which letter was designated by the sender. The dials never stopped, and any slight want of synchronism was corrected by moving the cover. Hughes' printing instrument is the fully developed form of this rudimentary instrument. A gas pistol was used to draw attention, just as now a bell is rung. The primary idea of reverse currents is to be found where Sir Francis suggests that the wire when charged with positive electricity should discharge not to earth but into a battery negatively charged. Equally interesting is the discussion on what we now call lateral induction, then known as compensation. The author clearly saw that in the underground wires which he suggests as substitutes for aerial lines, this induction would be or might be a cause of retardation. His own words must here be quoted:—"That objection which has seemed to most of those with whom I have conversed on the subject the least obvious, appears to me the most important, therefore I begin with it, *viz.*, the probability that the electrical compensation, which would take place in a wire enclosed in glass tubes of many miles in length (the wire acting, as it were, like the interior coating of a battery) might amount to the retention of a charge, or, at least, might destroy the suddenness of a discharge, or, in other words, it might arrive at such a degree as to retain the charge with more or less force, even although the wire were brought into contact with the earth." This passage, written in 1823, is very remarkable, and would alone entitle the author to be mentioned in any history of underground or submarine telegraphs. Testing-boxes were invented by Sir Francis, and a code is suggested by him. If these things had been mere suggestions they would have been remarkable, but accompanied by practical experiments proving that the scheme could be carried out, they ought to connect his name permanently with the history of the Electric Telegraph.

F. J.

LETTERS TO THE EDITOR

[The Editor does not hold himself responsible for opinions expressed by his correspondents. No notice is taken of anonymous communications.]

Oceanic Circulation

ON returning from my second Mediterranean cruise, I find that Mr. Croll has published in the *Philosophical Magazine* his promised demonstration of the theoretical impossibility of the production of under-currents by gravitation, according to the doctrine which I have advocated with reference to—

1. The Gibraltar Current.
2. The Baltic and Black Sea Currents.
3. The General Oceanic Circulation.

At the same time I find awaiting me a very important treatise