by Lord Kelvin was evidently not selected by him as specially appropriate or illuminating, but merely used as part of a well-known phrase or quotation. It is clear that what our chief meant was that the formation of a crystal, and such like, proceeded in accordance with the unsupplemented laws of ordinary mechanics; whereas the formation of an animal or plant seemed controlled by something additional —viz., the presence of a guiding principle or life-germ, the nature of which neither I nor any other physicist in the least understands. I shall be surprised if biologists claim that they really understand it either.

It is true that Lord Kelvin employed the popular phrase 'creative power'—a phrase I should not myself use, because I am unable to define it—and in other respects his wording was more appropriate to a speech than to a philosophic essay, but nevertheless his speech as reported had all the usual subjective interest attaching to the freely-spoken personal convictions of a great man, attained as the outcome of a lifelong study of various aspects of nature.

As to the little parting shot at me about 'telepathy,' it is true that I regard it as a recently discovered fact, opening a new and obscure chapter in science; it is also true that Lord Kelvin, Professor Ray Lankester and nearly all biologists disagree contemptuously with this opinion. Well, we shall see. *Die Zeit ist unendlich lang.*

Yours faithfully,

OLIVER LODGE.

THE UNIVERSITY OF BIRMINGHAM,
May 19, 1903.

SCIENTIFIC BOOKS.

Reports of the Princeton University Expeditions to Patagonia, 1896–1899; I.—Narrative and Geography. By J. B. HATCHER. Princeton, The University. 1903. 4to. Pp. xvi + 314; plates and map.

From the rather meager remains of vertebrates collected on the renowned voyage of the *Beagle* and turned over to Richard Owen by Darwin for study, paleontologists were first made aware of what has proved to be practically a new world of animal life which, though for the most part now extinct, was, within times geologically recent, extremely rich.

The novelty and wealth of this extinct fauna were fairly indicated by the discoveries of Fitzroy and Darwin, but the interest then aroused went little further until about 1887, when Señor Carlos Ameghino accompanied an expedition to southern Patagonia and began that series of discoveries which has since made him, and his brother Florentino, famous. The new world brought to light by them was totally unlike anything previously known among vertebrate faunas either living or fossil, and aroused the interest of paleontologists, geologists and zoologists everywhere.

Incidentally to the work of describing and classifying these remarkable remains certain hypotheses were advanced by the brothers Ameghino which concerned the relations of these fossil animals to those of the northern hemisphere, and the age assigned to the strata in which the fossils were found. These hypotheses were not generally accepted, and for some time it has been regarded as most desirable that an examination of the geology should be made by experts trained in other fields. This it was thought would harmonize the conditions revealed by observation in Patagonia with the results of expert work elsewhere, and clear up the confusion which seemed to have arisen in regard to the age and succession of the Patagonian strata.

It was for this purpose that Mr. Hatcher organized and carried out the explorations described in this volume, while he was curator of vertebrate paleontology for the university. Their primary object was to make observations and collections bearing on the geology and paleontology of the region, while such attention as circumstances allowed was from time to time directed to other branches of natural history. The cordial and effective cooperation of Professor W. B. Scott, head of the department of geology and paleontology,

was accorded to Mr. Hatcher, and substantial financial aid was extended by friends and alumni of the university. The publication of the results in the sumptuous and elegant form in which they appear is made possible through the generosity of Mr. J. Pierpont Morgan; while acknowledgments are also due to South American officials, as well as to Dr. Florentino Ameghino and other naturalists of the region under consideration.

From March, 1896, to July, 1897, and from December, 1898, to September, 1899, Mr. Hatcher was in the field assisted by Mr. O. A. Peterson, and during the year following November, 1897, by Mr. A. E. Colburn. Much of the work was done on horseback, with a light wagon for transporting supplies and collections. The character of the Patagonian plains is such as rendered this method practicable even if frequently difficult. About half the total area of the region consists of vast terraced plains intersected by river cañons and of a subarid character, which, in the central portion, have been overflowed by lava beds covering hundreds of square miles. To the westward, out of a very mountainous region, rises the Andean range, cut here and there by rivers which rise in lakes on its eastern side.

At the base of the Andean mountains the Patagonian plains have an altitude of 3,000 feet, and slope very gently to the eastward. About fifty miles from the Atlantic coast they descend more rapidly by a series of terraces or escarpments which face to the eastward. The lowest of these has an average altitude of 350 feet and terminates in abrupt cliffs which, for a thousand miles, constitute the margin of the land, except for a narrow beach at the base, which, at high water, is covered by the sea or drenched with the spray of a perpetual and tremendous surf.

Scanty grasses with stunted shrubbery in occasional patches are characteristic of these vast and silent stretches, redolent of a loneliness which grips the imagination.

In the narrow cañons, or by the rivers in broad valleys of erosion, the traveler may come upon green spaces where the vegetation breaks into a joyous luxuriance, where birds abound, and deer and other animals meet man with fearless curiosity. Here the eye may search in vain for a limit to a basaltic desert extending in flat and stern monotony for leagues beyond the visible horizon. There some broad salt pan with deceptive mirage mimics the prehistoric lake of which it forms the dregs. At times wrapped in gloomy fogs or swept by tempests of incredible violence; fronting the towering Atlantic surges with unshaken cliffs and serrate talus, looking out to shifting bars of sand, the terror of the navigator; a vast cemetery for ghostly herds upon the like of which alive no man has ever gazed; it is a strange, silent, bitter, lonely land.

How our author went out into it, what he met, and how he fared, are told in modest yet most interesting fashion in this stately quarto. His story is so interesting and the unpretentious courage of the narrator so evident, the spirit of the land and its mysterious fascination so fully expressed, that few will close the book without a regret that it can not reach a wider audience. It is really too good to be reserved for the readers of quartos.

The volume is so full of scientific meat that it is difficult to make a satisfactory abstract, and impossible to condense it within the limits of such a review as this. There is something for every taste. The life of bird and beast; the phases and contrasts of vegetation; the life of the Tehuelche Indians and the waifs who have cast civilization aside like a garment, at the call of the wild; the topography and geology; and mingled with it all a flavor of real North American character to which something in each reader's soul will leap with sympathy and admiration.

It is pleasant to add that the adventurous undertaking proved a success, and its hardy leader may be congratulated, not only on the accomplishment of his project, the clearing up of geologic doubt and the gathering of long-buried scientific treasure, but also on the way he has told the story and the attractive manner in which it is illustrated and published.

W. H. DALL.