up over the same line of fracture. Viewed in their totality, they occupy a belt of country which is very long (over four thousand miles), and relatively narrow. Any one can judge for himself how far this arrangement is linear. Much the same may be said of the whole circuit of the North Pacific. In this volcanic girdle, there are many distinct volcanic areas, and more or less elongated belts; but the intervals between them are wide, and no inter-dependence has hitherto been shown to exist. Of course a line can be drawn through them all if it be crooked enough, and makes no note of the enormous gaps and *echelons*.

The generalization that volcanoes are near the sea, or in it, has also been overstrained. How far from the sea may a volcano stand, and still be said to be near it? If we say ten miles, then very few land-volcanoes are near the sea. If we say two hundred and fifty miles, then the statement holds good, but is shorn of a large part of its meaning. The reader must judge for himself whether a point a hundred and twenty miles or more from the sea is 'near' it; and the great volcanoes of North and South America are, on an average, about that distance from the ocean. Even in this qualified sense, the statement ceases to be true the moment we recur to those volcanoes which were active in middle and late tertiary time; for many of them in our own country were five hundred to a thousand miles away from any body of water, and those of central France and Germany were almost as far from the ocean as the configuration of Europe would permit.

The last chapter of Mr. Vélain's book, and the briefest of all, treats of the causes of volcanic action. In common with many others, he regards as the most acceptable view that lavas are squeezed out of a melted nucleus through a rocky crust by the contraction of the earth's interior by secular cooling. C. E. Dutton.

BOLTON'S CATALOGUE OF SCIENTIFIC SERIALS.

It can hardly be true, that the series of scientific publications, whether in the form of independent journals, or as publications of societies, can be found more complete in American libraries than in European; but it certainly has fallen to the new world to give to the old the best lists of such periodicals extant. Scudder's 'Catalogue of scientific serials,' published inside9, was almost the first attempt to embears in one volume the bibliography of publishins of this class; and the present volume, when brings the literature down to the close to the year 1882, has improved in many reflects upon its predecessor. Especially is this the case in the fulness of the titles. The difference between these two publications is principally in that Scudder's catalogue was mainly restricted to pure science, while Bolton's extends to nearly all the fields of applied science, excepting medicine; but, on the other hand, with few exceptions, it does not include serials published by learned societies. The pains taken by Dr. Bolton is evident on every page of the catalogue, and it will long remain a most important auxiliary to every scientific library.

Besides various forms of index which add markedly to its value, especially the library check-list, enabling one to find at a glance where in America a given series may be found, we desire to call special attention to the chronological tables which follow directly the main list. In this, Bolton has followed a suggestion made many years since by Dana, but never hitherto carried into effect: it indicates the exact year for which each volume of certain long series of publications was issued; and it is an interesting study to see with what ingenuity the various changes undergone by such publications as the Edinburgh philosophical magazine for instance, with its various splits and absorptions, have been tabulated. In this list are included about five hundred of the most important journals; and it will save a vast amount of labor on the part of many a writer, who, with an eye to 'priority,' will wish to know in what year a certain volume of a given publication was issued.

The only criticism, which, it appears to us, can be made to the work, is on a matter which deals purely with typography. The type is much larger than is requisite or convenient for such a purpose, expanding the volume to nearly eight hundred pages: had it included, as we certainly wish it had, all publications of societies, its extent must have been doubled, and its bulk altogether unfortunate. This fault is especially seen in the chronological tables, which should have been compressed to nearly one-half their present space. It is one of the prime qualities of a good index, that it should be as compact as possible; and these tables, sharing as they do the nature of an index, ought thus to have been compressed. These, however, are faults only of style: concerning the body of the work, its method

A catalogue of scientific and technical periodicals (1665–1882), *together with chronological tables, and a library check-list.* By H. C. Bolton. Washington, *Smithson. inst.*, 1885. 8°.

and its execution, we can have nothing but praise. Dr. Bolton has laid the scientific men of the whole world under a deep debt of gratitude; while those who really know the severity of the task he has so faithfully accomplished, will be forced to acknowledge that painstaking is not confined to Germany.

THE FIFTH VOLUME OF OHIO GEOLOGY.

THE fifth volume of the Ohio state geological report, crammed almost to bursting with extremely valuable information, up to more than eleven hundred pages of wretchedly thin paper, poor printing, and coarse illustrations and maps, puts us in doubt which to wonder at most, — the unenlightened niggardliness of the great wealthy pork-raising state of Ohio, or the intelligent, generous zeal of its few geologists. They, indeed, have evidently been urged on by self-sacrificing devotion to learning, and, far beyond what could have been expected from the petty means given them, have filled their measure to overflowing with knowledge that is either immediately and obviously useful, or of less direct, but wider, more manifold, and of more lasting utility.

About seven hundred pages of the report, themselves enough for a bulky tome, are the work of the able state geologist, Professor Edward Orton, done "in conjunction with the duties of his professorship at the state university;" for, of course, the state could not afford even to employ the chief of so important a survey on full time. He discusses in a hundred and twenty-eight pages the stratigraphical order of the lower coal-measures in Ohio; in forty pages, their coal-beds; in three hundred and fifty-two pages, the mines upon them, county by county; in sixty-five pages, the iron ores of the state, geologically and geographically considered; and in sixty-five pages (collaborating with Dr. G. W. Hawes), its building-stones, especially the celebrated Berea grit. He wisely avoids attempting to assign numbers to the different coal-beds, — an impracticable or impossible task, since they thicken up in so many places, or thin out and disappear, — and adopts the local names already in use in western Pennsylvania, where steeper valleys, with less drift and more frequent exposures, have earlier enabled the order and identification of the beds to be correctly made out. He maintains that the coal-beds never extended much, if at all, beyond their present northern boundary, and that the great basin gradually contracted by general elevation, and argues that their thickest portions are confined to their borders. He has to point out that more careful surveys reduce the formerly supposed extent of the workable coals. Rarely are there more than one or two workable coal-beds at any one spot; and there is great loss of coal from tenderness, impurity, or a poor roof or floor, as well as from lack of proper care. He shows (p. 263) that a considerable disturbance occurred near the end of the lower coal-measure period in Tuscarawas county.

The state chemist, Prof. N. W. Lord, besides twenty-eight pages on the chemical work of the survey, including fifteen pages of tables of analyses, contributes an admirable chapter (a hundred and seventeen pages) on the iron manufacture of the state, noticeable for the extent to which raw bituminous coal is used, and in the hanging-rock region for the amount of charcoal-iron still made. In spite of some deficiency in rhetoric (so apt, with language, grammar, and logic generally, to be neglected by scientific men, to their own immense disadvantage in respect of easy mental work as well as to the discomfort of their readers), he certainly has the root of the matter in him; and his thorough comprehension of the subject results in sound practical advice. Good sampling gives much greater value to the analyses than any in the previous volumes have.

The state geologist's son, Mr. E. Orton, jun., gives an excellent chapter (seventy-nine pages) on the clays and all their manufactures, from common brick up to terra-cotta; and one (twenty-five pages) on the coals of Coshocton county. The former state inspector of mines, Hon. Andrew Roy, contributes a very good treatise (seventy pages) on the coal-mining of the state, including some notice of the coal-cutting machinery that is gradually coming into use. He has, too, a dozen pages on the coals of Jackson and Wellston. There are also a very good chapter (twenty-two pages) by Mr. H. Newton on coke-making; one (twenty-eight pages) by Mr. E. McMillin on the gas-coals; one by Prof. G. F. Wright (twenty-three pages) on the glacial boundary, pointing out that it separates better soils on the north from poorer ones on the south; one by Prof. A. A. Wright (twenty-seven pages) on the coals of Holmes county, with the scales of its numerous columnar sections, each carefully marked, — a convenience wanting to many sections and maps in the other coal chapters; and one (twenty-nine pages) by Mr. C. N. Brown on the Meigs-Creek coal of the upper coal-measures, very full in local details.