That there is no contradiction between theism and evolution our author clearly shows. But he goes even further than this, and claims to prove that evolution is radically inconsistent with atheism. He thinks that the two thoughts, when carried to legitimate extremes, lead to suicidal contradictions; leading, in fact, to the extremes of Comptism, and its necessary worship of human nature as the loftiest thing in existence. Now, whatever may be said of this discussion, it is plain that the reader's judgment of this part of the work will depend largely upon his willingness to accept the conclusion. If he reads with a predisposition against the conclusion, the whole argument will be regarded with the same indifference as are all other arguments which try to prove the existence of God. But if he reads, accepting the conclusion, and wishing to find a justification for a belief in theism, he will be abundantly satisfied; for the arguments are keen and forcible, and plainly show that theism is exalted by the conceptions of evolution.

In his attempt to refute Spencer, our author has not been quite so successful. To refute such a system of philosophy as that of Spencer is as difficult as to demonstrate it. It may be easy to criticise Spencer, to show his false deductions and an amount of inconsistency in his writings. This our author has succeeded in doing well enough. But to refute his philosophy is a different matter. An examination of this criticism shows that it is chiefly upon Spencer's ideas of primal cause, and therefore upon his conception of the significance of law, and not at all upon his theory as to the development of the visible universe. Our author first shows that Spencer's philosophy is one of involution, and not evolution, — a fact which Spencer himself recognized. Our author gives a definition of evolution which completely reverses that of Spencer. He makes it a passage from the complex to the simple, rather than from the simple to the complex. What he means by this is not that nature has not seemed to grow more complex, but that this growth has been only the unfolding of forces and tendencies which have existed from the beginning. Evolution is therefore a revealing of that which is hidden, and is thus really a simplification. An egg is more complex than the adult, since, though seemingly simple, it contains in a small space, in addition to that which we can see, forces and tendencies which regulate the growth of the adult. Its development is simply the unfolding of this potentiality. And so the original nebula was really infinitely complex, since it contained in its laws and tendencies the possibility of the system which has arisen from it. This, our author claims, is in direct contradiction to Spencer's philosophy of a passage from the simple to the complex, and this philosophy is therefore false at its foundation. It is a restatement of the old saying that evolution cannot exceed involution. Now, in reality, our author and Spencer do not disagree so much as at first seems. Spencer has only attempted to explain the visible universe by his philosophy, recognizing his inability to explain or comprehend law. In the visible universe there has undoubtedly been an increase in complexity. Spencer would not for an instant deny that the original nebula contained in its laws and tendencies the potential system. The difference between our author and Spencer is thus only in their metaphysical conception of the significance of these laws and their relation to the first cause which lies beneath them. It is the difference between theism and agnosticism again. Spencer regards the universe as without design: our author regards the working of law as the unfolding of a plan. Spencer looks upon the seeming design in nature as resulting from the natural working of law, without attempting to go beneath this statement: our author goes a step further, and puts the plan in the nature of the laws themselves. These two positions are not necessarily contradictory, though when regarded in certain lights they may be so.

This discussion of Mr. Rred's is therefore valuable as an exposition of the meaning of theistic evolution. It shows that theistic evolution is consistent with all the facts of science, and that the law of evolution, when viewed from the theistic stand-point, contains a significance which is utterly wanting to it when regarded from the stand-point of atheism. But as a refutation of Spencer it is hardly a success; for it has only shown that the conception of Spencer's Unknowable as an intelligent personality is preferable to the agnostic position of Spencer.

TWO SCHOOL-BOOKS ON GEOLOGY.

THERE can hardly be found a greater contrast in the methods of treatment of a subject than is presented by a comparison of the school-books on geology lately prepared by Professors Geikie and Winchell. The authors seem to have had scholars of about the same high-school age in mind. Their objects are similar, — for one makes 'an appeal to the powers of observation,' and the other wishes 'to foster a habit of observation,' — and yet how different are their paths to this common end! Professor Winchell begins, after advising teachers

Class-book of geology. By ARCHIBALD GEIKIE. London, *Macmillan*, 1886. 8°.

Geological studies; or, Elements of geology. By ALEXANDER WINCHELL. Chicago, *Griggs*, 1886. 8°.

to 'adhere scrupulously to the *method* of the book,' with so complex and difficult a formation as the drift, collects specimens from it, tells a little about chemistry, more about minerals and rocks, describes eruptive rocks before considering eruptions, briefly discusses sedimentation and erosion, describes geological maps and sections, and so on through the first part of his book, the outcome of which may very likely be, as he suggests, "a somewhat chaotic and undigested mass of facts and doctrines, buried in a considerable volume of verbiage." Then follows part ii., attempting to give as a complement to the first a methodical re-presentation of what has already been encountered, but in extremely condensed form. So fundamental a matter as cycles of sedimentation are quickly passed over, with very brief illustration; and even the lesson of unconformability is given little emphasis, although more than four pages are devoted to the recent theories of ancient tides and tidal action. Altogether too much is attempted under the heading of formational geology, considering the small space allowed it: much of this might be omitted to the advantage of the rest, as the book is not intended for a manual. But the greatest difficulty seems to be that the book tries to take the place of the teacher. For example: on p. 128 we read, "You ought to take a great deal of exercise on the geological map, and especially in the construction of sections, no matter if it requires two or three days to finish one study." Any teacher whose instruction needs to be supplemented by such dictation as this can hardly be expected to have ability enough to use and explain the rest of the book properly; and certainly no teacher of independence and originality can wish to have questions of method so minutely defined for him by some one else. In the hands of the author, with the inspiration of his enthusiasm and knowledge before the class, such instructions may serve a purpose; but inspiration in teaching is seldom transmitted through the medium of printer's ink.

The plan of Professor Geikie's book is preferable, because, while it gives a simple, attractive presentation of facts, arranged in a very natural order, it leaves the teacher free, if he desire to arrange a course for himself, to plan his own method on minor points, and gain inspiration with originality; or, on the other hand, it provides chapters that can be read with entertainment and used as bases for set recitations, if the teacher is satisfied, or is obliged merely to follow a book. The physical chapters run about as follows: action of atmosphere and water, effects of lakes and springs, ice and the sea, fossils, volcanoes, and earthquakes. Then come minerals and rocks; rock-structures, original and secondary; and, finally, the historical view, occupying a third of the book. The proportion is somewhat less in Professor Winchell's book: it might be in both still further reduced to the advantage of the class of students addressed, for the first view of historical geology is too much encumbered with meaningless fact to develop thought or to train the understanding. Instead of reviewing in condensed form the whole column from archaean to present, the student would learn more from the deliberate description, illustration, and discussion of a small part of it, which might then serve as a key to the understanding of the rest in later years of study.

The illustrations are, as a rule, better in the English than in the American book, though the latter are good, on the whole. The only bad picture that has Professor Geikie's tacit approval is his fig. 10, that tries to represent torrent-cut gullies on a mountain-side: it has the 'made-to-order' look. The vertical exaggeration allowed in the sections is the most serious defect in the illustration of Professor Winchell's book: it is true that these are generally copied from venerable state reports, and have authoritative names to justify their use, but they are bad, for all that. No proper idea of the geological structure of Tennessee can be gained from the section on p. 93; and the original section across Michigan, p. 126, might well be labored over to bring it somewhat nearer the true scale, no matter if it required two or three days to finish it.

THE annual report of the commissioner of pensions for the fiscal year ending June 30, 1886, shows the vast extent of our pension system. At the close of the year there were on the rolls 365,783 pensioners, of whom 265,854 are classified as army invalids; 80,162 as army widows, minor children, and dependent relatives; 2,953 as navy invalids; 1,878 as navy widows, minor children, and dependent relatives; 1,539 as survivors of the war of 1812; and 13,397 as widows of those who served in that war. 1,406 survivors of the war of 1812, and 3,815 widows of soldiers of that war, died during the year. 40,857 new pensioners were added to the roll during the year, and 2,229 whose pensions had been dropped were re-instated. As 22,089 were dropped for various causes, the net increase was 20,658. The average annual value of each pension is $122.23, and the aggregate annual value amounts to $44,708,041.51. The amount paid during the year, including the arrearages, was $63,797,831.61. In all but 118 of the 2,647 counties in the United States, pensions are being paid, and 1,691 pensions are paid in 35 foreign countries. Verily, republics are not always ungrateful.