from reasoning, a separation which ought not to be made, because analysis of the former proceeding shows it to contain the same elements as the latter. His attaching a very high importance to definition is more in accordance with the tendencies of natural science than it is with the doctrines of that nominalistic school of metaphysics with which Mr. Bain is affiliated. He rightly insists that the characters of the object which are enumerated in the definition should be such as are *important*, but his analysis (usually weak) fails to detect in what the *importance* of a character consists. A sentence which he has quoted from Sir George Cornewall Lewis might have furnished him with a hint. "By including in monarchies," says that writer, "and excluding from republics, every government of which a king is the head, *we make every true general proposition respecting monarchies and republics impossible*." An *important* character is obviously one upon which others depend, that is, one the inclusion of which in a definition renders true general propositions concerning the object defined possible; and the more such propositions a character renders possible, the more important it is. In the same way, a natural class is one which can be so defined that something can be predicated of it which cannot be predicated of the genera included in its definition. Mr. Bain endeavors to make the logical definition identical with the scientific definition— a most worthy aim; but we fancy that zoölogists and botanists are already so much advanced in the knowledge of classification beyond the mere logician, that Mr. Bain's maxims will have little weight with them.

In treating of causation, Mr. Bain includes in the pure logical principle the law of the conservation of force, which according to him, in opposition to the physicists, refers not to *vis viva* but to *momentum*.

He gives a long account of the systems of De Morgan and Boole, but not such a one as they would approve, and he makes some serious mistakes.

As a school-book the work has some advantages, but even where the author's thought is perhaps not itself vague, his manner of expressing it is not calculated to inculcate precision in the mind of the pupil.

1871

12 (13 April 1871) 258

NOTES

This obituary notice is mentioned in the note that immediately follows—12 (20 April 1871) 276—which Fisch attributes to Peirce. Therefore, the foregoing notice is included here in order to complement comments in the next item. This piece is unassigned in Haskell's *Index to* The Nation, vol. 1.

—A scarcely less voluminous writer was Professor De Morgan, who was born at Madura, in Southern India, in June, 1806, of a family distinguished in the military service. His mother's grandfather, however, who was a mathematical teacher of some eminence, may be supposed to have predetermined his career. In 1827, he gained at Cambridge the first place in the mathematical tripos of that year, but declined to subscribe to the religious tests necessary to obtain either the degree of M.A., or a college fellowship. In 1828, he accepted the professorship of mathematics in the London University, the principles on which that institution was founded being in accord with his religious independence; and he abandoned this position in 1866 when, as he thought, in violation of those principles, James Martineau was refused a professorship on account of his theological opinions. In the service of the London insurance companies, "he raised the actuary's vocation to the dignity of a profession," and was almost to his last day the confidential adviser of several associations. His "Essay on Probabilities," "Elements of Algebra," "Formal Logic, or the Calculus of Inference Necessary and Probable," and "Differential and Integral Calculus," are among the works which made him distinguished, but which show but a small part of his intellectual activity. He was a constant contributor to various periodicals, to the *Athenæum* from 1840; and by no means on mathematical subjects alone. "His contributions to Knight's *Penny Cyclopædia* are a considerable proportion of the entire work. "He passed for diversion's sake from one arduous study to another;" but found time to acquire a good degree of proficiency as an instrumental performer, and was a habitual and eager reader of novels, especially of humorous novels. As a mathematician he had the rare merit of not overestimating his favorite science, though he proved by his "Formal Logic" that it was not incompatible for a mathematician to be also a logician; and he was accordingly one of the weightiest adherents that Spiritualism has ever won over. A treatise of his on these manifestations, entitled "From Matter to Spirit," was written in 1863. As a writer and a teacher, he was one of the clearest minds that ever gave instruction, while his genial and hearty manners in private and in the school-room strongly attached to him all who came in contact with him. He was a man of full habit, much given to snuff-taking; and those who have seen him at the blackboard, mingling snuff and chalk in equal proportions, will not soon forget the singular appearance he often presented.

12 (20 April 1871) 276

NOTES

Attributed to Peirce by Fisch in *First Supplement* (internal evidence). This notice is unassigned in Haskell's *Index to* The Nation, vol. 1. Peirce met De Morgan in 1870.

—We need not apologize for adding to the sketch we gave last week of the late Professor De Morgan a few remarks of a more critical nature. Among mathematicians he was distinguished more for the completeness of his logic than for analytical facility. His pupils speak of him with warm admiration, but it may be presumed that they gained from him even more of general skill in accurate reasoning than of specific mathematical power. His elementary books, which are not enough known, are excellent, especially for students who have no natural turn for mathematics; and his work on the calculus is unusually complete, and its demonstrations particularly instructive. Of his researches, one of the most noticeable is his paper on triple algebra, which traces out the consequences of certain definitions of symbols in a manner much like that of his formal logic; but for this difficult subject De Morgan's analysis was not sufficiently subtle and he can only be said to have started the enquiry without having arrived at any valuable results. His best contributions were to mathematical logic. In his controversy with Sir William Hamilton, in 1847, both disputants fought in the dark, because Hamilton's system had never been published, and Hamilton had never patiently examined De Morgan's. All the points of Hamilton's attack were, however, completely disproved. Upon the publication of Hamilton's works, De Morgan renewed the controversy with Mr. Spencer Baynes, who, after an unconditional pledge to produce proof of his position, was compelled to abandon the field. Since that time Hamilton's once celebrated system has fallen into neglect, while De Morgan's commands more and more respect. In point of fact, Hamilton's system, like De Morgan's, is mathematical, but is the work of a mind devoid of mathematical training. It would be premature to try to say what the final judgment of De Morgan's system will be, but it may at least be confidently predicted that the logic of relatives, which he was the first to investigate extensively, will eventually be recognized as a part of logic. The best statement of De Morgan's system is contained in his "Syllabus of a Proposed System of Logic," but his fourth and fifth papers on the syllogism are of later date. De Morgan was a deep student of the history of the sciences to which he was devoted. He wrote many biographical notices of mathematicians in the "Penny Cyclopædia," and the "English Cyclopædia," as well as a bibliography of arithmetic. Indeed, the amount of his writing upon various subjects in the two cyclopædias, in the *Athenæum*, in the *Companion to the British Almanac*, in seventeen or more separate books, and in various scientific periodicals, including the *Journal of the Philological Society*, is enormous, and it is all very pleasant reading for its perspicacity, vigor of thought, wit, and a certain peculiar flavor of style. The last qualities are well seen in his "Budget of Paradoxes," published in the *Athenæum*.

13 (2 November 1871) 294

NOTES

This is probably by Chauncey Wright, inasmuch as the comments on Peirce's review of Fraser's *Berkeley*—see 13 (30 November 1871) 355-356—are by Wright, according to Haskell, in *Index to* The Nation.

There are six critical notices this month, and they compare favorably, for weight and learning, with the rest of the number, which, taken altogether, is a very good one, with nothing bad in it, and much that is very good, and having, indeed, no fault except the good-sized fault, that it is deficient, almost to destitution, in purely literary matter, and that, for a "Review," it notices not many books. Those which it does notice, however, it treats with all the customary care. They are these: Delbruck's "Uses of the Conjunctive and Optative in Sanskrit and Greek"; Dr. J. F. Clarke's "Ten Great Religions of the World"; the sixth edition of Professor Max Müller's "Lectures on the Science of Language"; the second and third volumes of Greene's "Life of Major-General Nathanael Greene"; Professor A. C. Fraser's edition of "Berkeley's Works"; and the "Battle of Dorking" —to the remarks upon which we have already referred. The initials "C.S.P." are appended to the review of Berkeley, and, doubtless, they stand for Mr. Charles S. Peirce, who, it is probable, has of all men paid most attention to the subject which he handles in this essay. It is much more than a mere notice of Mr. Fraser's volumes, and we must reserve till next week what we have to say about it.

13 (30 November 1871) 355-356

NOTES

Chauncey Wright, identification: Haskell, *Index to* The Nation, vol. 2.

Chauncey Wright (1830-1875) was graduated from Harvard College in 1852. He was known primarily as a philosopher, having contributed several important essays in that subject to the *North American Review*. In addition to working in philosophy, he made contributions to mathematics and biology, his essays in defense of the evolution of species being reprinted in England at Darwin's insistence. He became a regular member of the Harvard faculty in 1874, where he taught for one year until his untimely death.

—Mr. Charles S. Peirce, in his review of Berkeley in the last *North American*, to which we promised to return, takes the occasion to trace out in the history of philosophical thought in Great Britain the sources of Berkeley's doctrines and of later developments in English philosophy. These he traces back to the famous disputes of the later schoolmen on the question of realism and nominalism—that question on which each new-fledged masculine intellect likes to try its powers of disputation. But the motive of the schoolmen who started this question or gave it prominence, was not in any sense egotistical, however pugilistic it may have been, but was profoundly religious—more religious, in fact, than anything modern, and, perhaps, more fitly to be compared to the devotion that produced the Gothic architecture than to anything else. The most remarkable thing in the essay is Mr. Peirce's interpretation of the actual question so earnestly agitated,